THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LV. No. 1396.] LONDON, FEBRUARY 11, 1890. [42ND YEAR. Price 6d.

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MOST EFFECTIVELY AND *ECONOMICALLY RESTORES* LIME WASTES CONTINUOUSLY.

The Patentee having under his several Patents effected a complete solution of the Spent Lime difficulty, most confidently solicits the consideration of the fact by the Engineers and Managers of Gas Companies, Gas Corporations, and other Spent Lime producers. The adoption of these Patents secures the following amongst other advantages, viz.:—1st. Nuisance is avoided, and the utmost convenience and comfort in Gas purification are secured. 2nd. The Lime is recovered at from one-third to one-half the cost of new Lime, or from 5s. 6d. to 7s. 6d. per Ton (depending on extent of works and working charges). 3rd. The Lime is either recovered for Building and Agricultural purposes, or specially and continuously for Gas purification—no limit being assigned to its durability. 4th. Nearly the whole of the valuable sulphur is collected and sold. 5th. By the Patentee's Improved Furnace, breeze or inferior cannel coke only is required as a fuel. The process has been worked for a considerable time by several important Gas Companies and Corporations throughout the Kingdom, and with the most satisfactory results. The Patentee erects, proves, and grants working on very moderate terms.

Further particulars may be had on application to A. F. WILSON, Esq., Assoc. M. Inst. C.E., 12, Walbrook, London, E.C., Agent for London; J. E. FISHER, Esq., Stourbridge, Agent for the rest of England, Wales, and Ireland; or to the Patentee—

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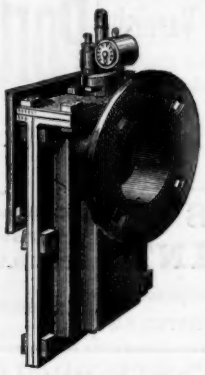
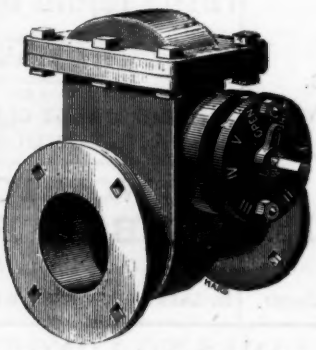


BRIDGE VALVE
for Regulating the Seal
of Hydraulic Mains.



FULL-WAY RACK AND
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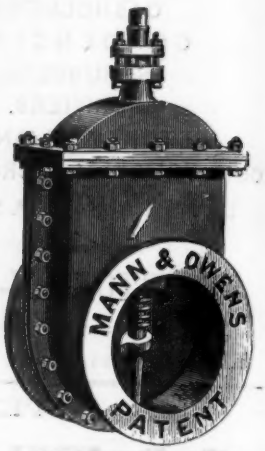

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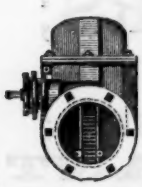
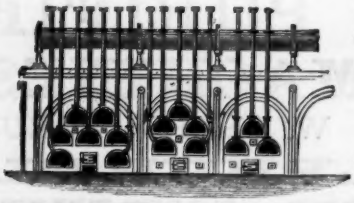
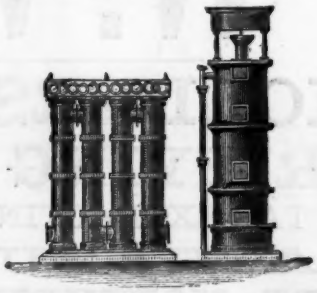
Also Bye-Pass & Stop Valves.







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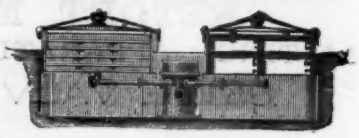

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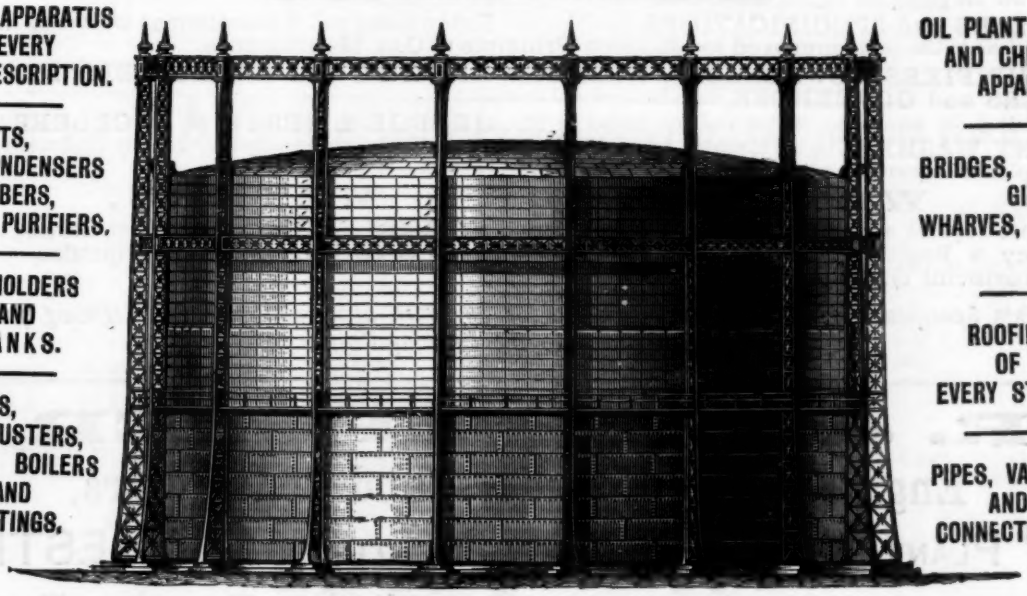

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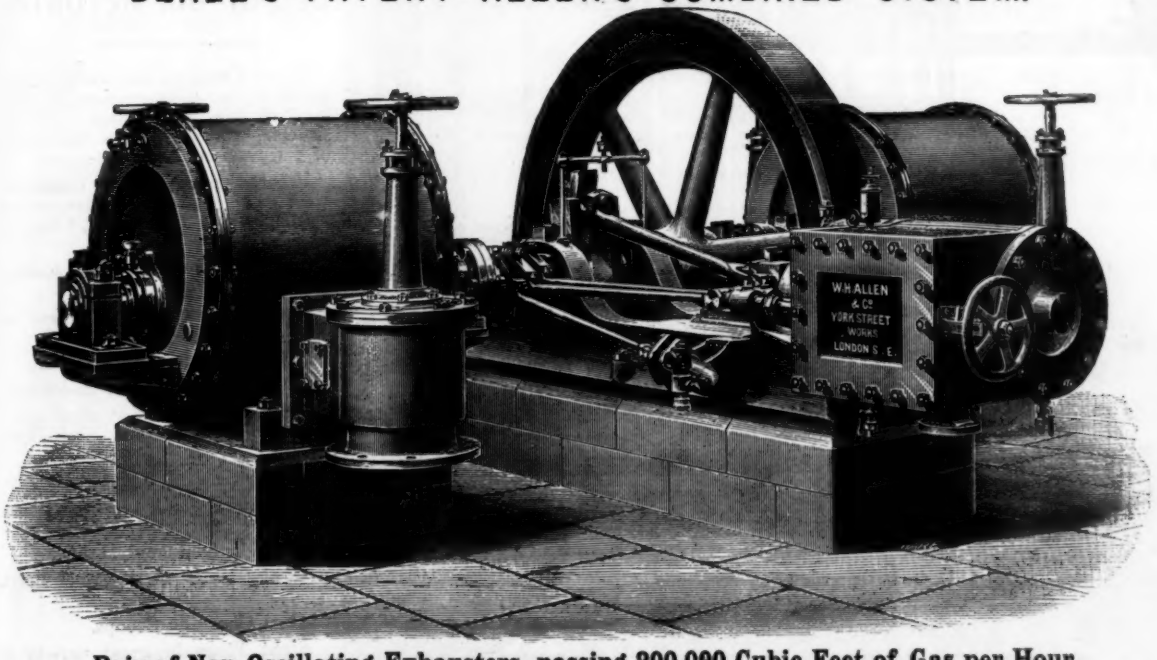

Pair of Non-Oscillating Exhausters, passing 200,000 Cubic Feet of Gas per Hour.

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PLANS and SPECIFICATIONS furnished for **Extensions** and **Enlargement** of existing **Works,** adapting them to the most **Improved** and **Modern Principle** of **Gas Manufacture.**

PURIFIERS, CONDENSERS, WASHERS, ENGINES and EXHAUSTERS, STATION METERS and GOVERNORS, manufactured and erected.

Makers, by permission of that eminent authority **Mr. GEORGE LIVESEY,** of his **CELEBRATED PATENT WASHER,** highly approved by all the Engineers of Works where adopted. Largely in demand.

Special reference and attention are invited to our

WET AND DRY METERS,

which have acquired a high reputation for the **excellence** of Materials and Workmanship; their **durability** and **accuracy** of **Register** guaranteed. They are used by several of the **London Gas Companies,** and over **200 Provincial Gas Companies.**

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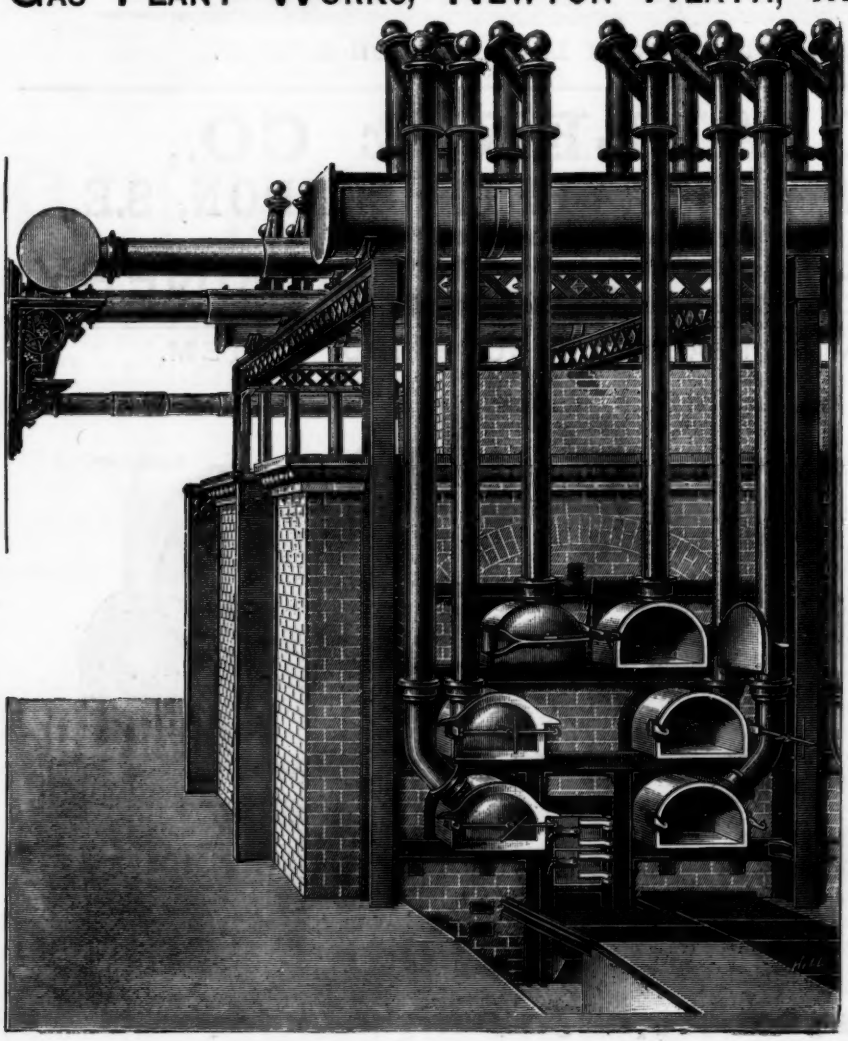

RETORT-BENCH

SHOWING APPLICATION OF

MESSRS. R. & J. DEMPSTER'S

PATENT

Regenerative Furnace

TO A

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These Furnaces are very economical in the consumption of Fuel and in the wear and tear of Retorts, and require a minimum of Excavation.

Retort-Benches erected complete, with or without Regenerative Furnaces, and with Brick, Clay, or Iron Retorts.

Mouthpieces with self-sealing Lids.

Stamped Retort-Lids, in Iron or Steel.

Arms, Cross-Bars, and Screws.

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Furnace Frames and Arch-Pipes in great variety.

Hydraulic Mains of all sections.

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Sight Plugs in great variety of Designs and Sizes.

PATENT GLASS LAMPS & COVERS

For Streets, Railway Platforms, &c., &c.

(Patented the 4th of May, 1889.)

This Lamp and Top, being made entirely of Glass, is perfectly impervious to corrosion, and therefore invaluable in Manufacturing and other Towns. The Top can be had in Opal, clear or coloured Glass; and is much cheaper than the old style of metal frames.

Prices on application.

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ANIMAL CHARCOAL CO., Limited, SHADWELL.
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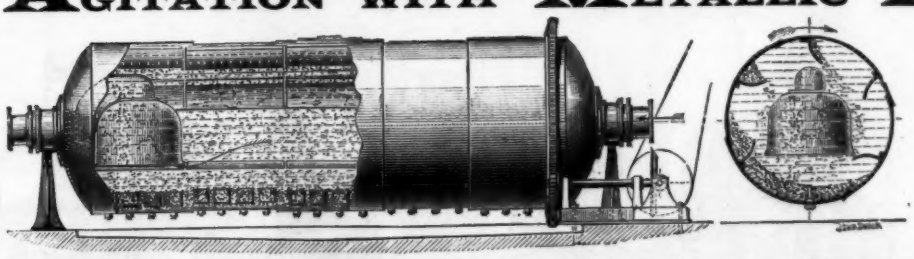
		HAMPTON COURT.

THE REVOLVING PURIFIER

(ANDERSON'S PATENT)

For the Purification of River Water and Sewage Effluent in Large Volumes, and for Removing Colour from Water containing Peat or Clay,

BY AGITATION WITH METALLIC IRON.



MADE IN FOURTEEN SIZES; CAPABLE OF TREATING SINGLY 5000 TO 1¼ MILLION GALLONS PER DAY. REDUCES ORGANIC MATTER FROM 45 TO 90 PER CENT.; TOTALLY REMOVES MICROBES FROM POLLUTED WATER.

GOLD MEDAL, INVENTIONS EXHIBITION, 1885.

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DOCK HOUSE, BILLITER STREET, LONDON, E.C.

TELEGRAPHIC ADDRESS, "GAS LEEDS."

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OF ALL FORMS & SHAPES IN IRON OR STEEL BY SPECIAL HYDRAULIC MACHINERY.

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UPPER GROUND STREET, LONDON, S.E.,

SUPPLY FROM STOCK

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AND ALL KINDS OF GAS-WORKS APPARATUS.

SOCKET-PIPES FOR GAS OR WATER PURPOSES.

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Sole Manufacturers of LYON'S 'PATENT' GAS MAIN SYPHONS.

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MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES,

TABLE GLASS OF ALL KINDS,

CHANDELIERS IN BRONZE AND ORMOLU.

MODERATOR LAMPS.

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NEW HIGH-POWER GAS-LAMP,

Westphal's Patent.

Gas Companies should hire these Lamps to their Consumers, and introduce them for Street Lighting as a rival to the Electric Light, as they do not get out of order, are most economical, and the Burner being a circular slit does not choke up.

Particulars and Prices Free.

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SOLE CONSIGNEES FOR GREAT BRITAIN & COLONIES

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R. DEMPSTER & SONS, Ltd.,

ESTABLISHED 1855.

ROSE MOUNT GAS ENGINEERING WORKS.

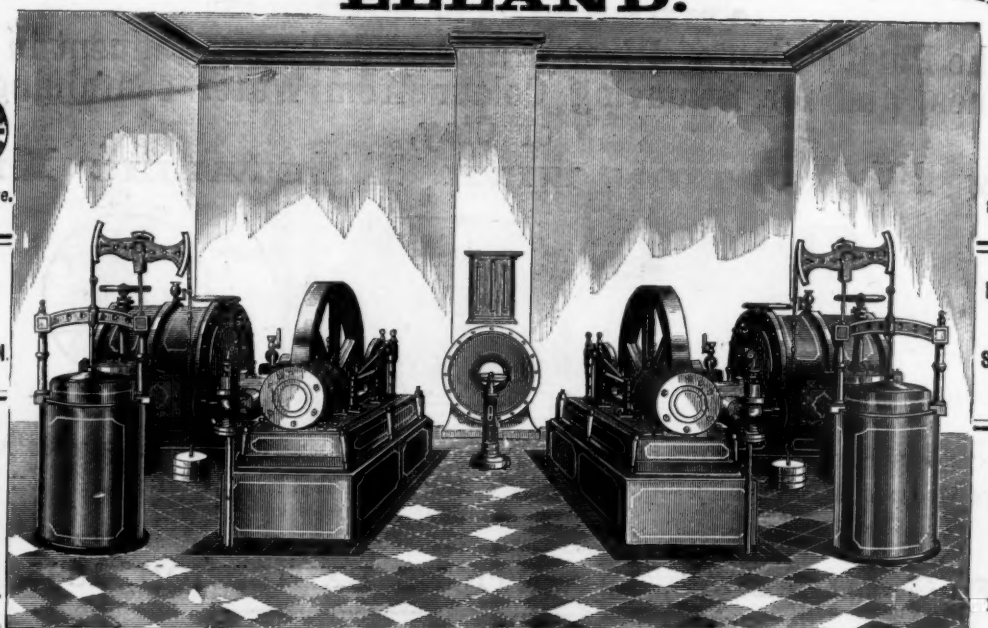
ELLAND.

No. 1. Flange Valve.

NO SLIP.

NO OSCILLATION.

No. 3. Screw Valve.



No. 5. Screw Valve.

NO HIGH SPEED.

STEADY GAUGE.

No. 6. Disc Valve.

THE ABOVE IS AN ILLUSTRATION OF A PAIR OF THE ELLAND ROTARY EXHAUSTERS ERECTED BY US AT WIGAN, EACH OF WHICH ARE CAPABLE OF PASSING 80,000 CUBIC FEET OF GAS PER HOUR.

Makers of every other description of Gas Plant, including Retorts, Retort Mountings, Condensers, Washers, Tar and Liquor Separators, Scrubbers, Purifiers, Gasholders any size, Patent Centre-Valves, Four-Way Valves, Rack, Screw, and other Valves.

Testimonials and References on Application to

DEMPSTERS', ELLAND.

IMPROVED STREET LIGHTING

AND

THE AVERAGE METER SYSTEM FOR STREET LAMPS.

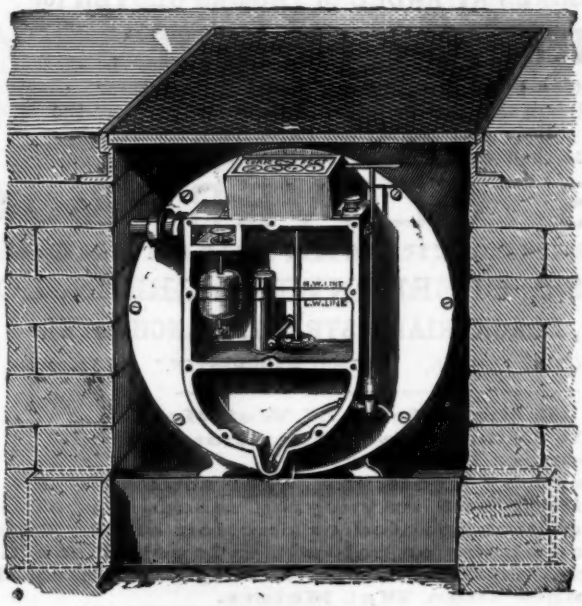
The Illustrations show the various Arrangements of Meters for these purposes. The cases are of cast iron; and the sizes are up to 20 lights for Brick Tank and Iron Box, and up to 5 lights for Pillars. Are largely used in London and Provincial Towns, giving great satisfaction. This is chiefly due of Meters being on the **WARNER & COWAN** Principle. Its advantages are:—

Correct Registration, with Variable Water Line.

Long Float Range, preventing Valve being Closed by Vibration from Traffic.

Frequent Inspection unnecessary, as Meters need only be watered at intervals of nine to twelve months.

To prevent Freezing, a little Glycerine should be mixed with Water when severe frost sets in.

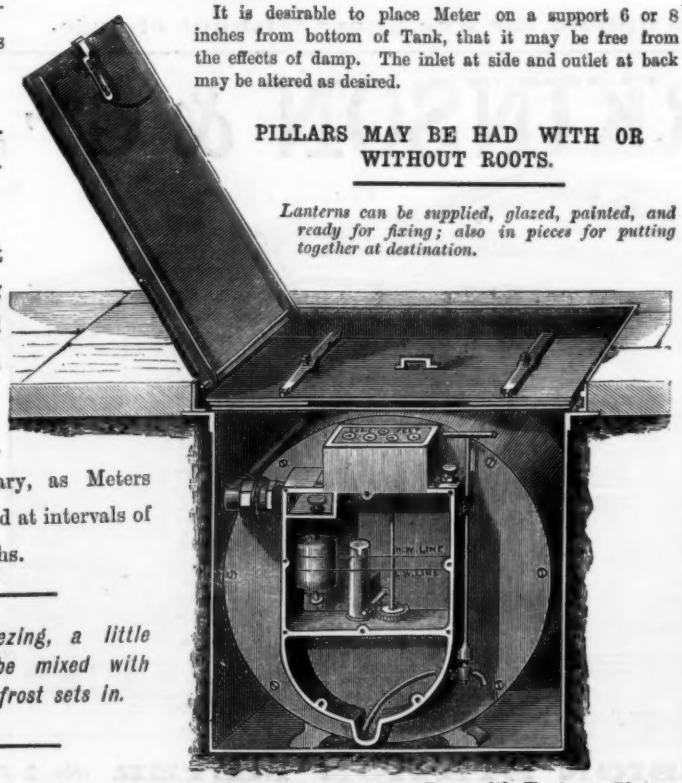


Meter in Brick Tank, with Footway Plate.

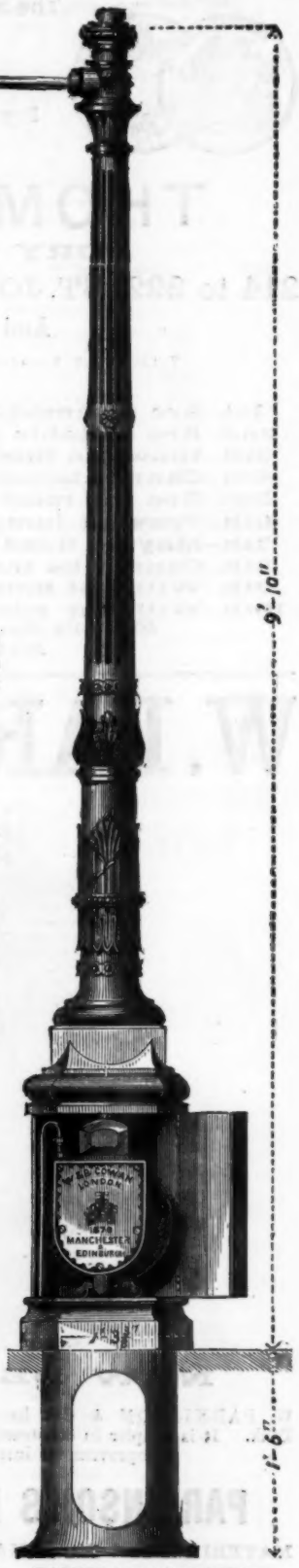
It is desirable to place Meter on a support 6 or 8 inches from bottom of Tank, that it may be free from the effects of damp. The inlet at side and outlet at back may be altered as desired.

PILLARS MAY BE HAD WITH OR WITHOUT ROOTS.

Lanterns can be supplied, glazed, painted, and ready for fixing; also in pieces for putting together at destination.



Meter in Water-tight Cast-Iron Box, with Footway Plate.



WARNER-COWAN METER IN STREET-LAMP PILLAR.

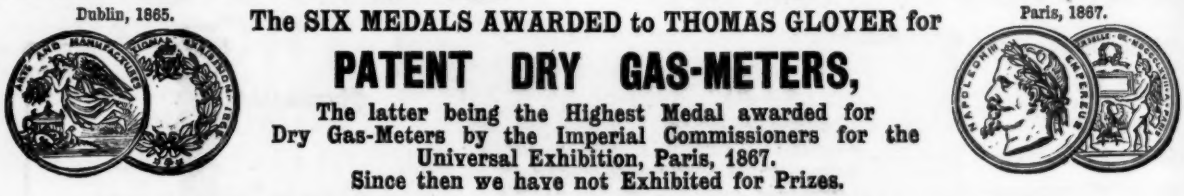
W. & B. COWAN,

LONDON, MANCHESTER, AND EDINBURGH.

ESTABLISHED 1844.] **ORIGINAL MAKERS.** [ESTABLISHED 1844.

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.



The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.
Since then we have not Exhibited for Prizes.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.;

And at 37, BLACKFRIARS STREET, MANCHESTER.

TELEGRAPHIC ADDRESSES: "GOTHIC LONDON," "GOTHIC MANCHESTER." TELEPHONE No. 6725.

1st—Are a remedy for all the defects of Wet Meters.
2nd—Are suitable for all climates, whether hot or cold.
3rd—Incur no loss of Gas by Evaporation.
4th—Cannot become fixed by Frost, however severe.
5th—Are the most accurate and unvarying measurers of Gas.
6th—Prevent jumping or unexpected extinction of the Lights.
7th—May be fixed either above or below the level of the Lights.
8th—Cannot be tampered with without visibly damaging the outer case.
9th—Will last much longer than Wet Meters.
10th—Will not cost more than one-half for repair that Wet or Water Meters do.
Are upheld for five years without charge.

W. PARKINSON & Co.,

COTTAGE LANE WORKS.
CITY ROAD, LONDON.

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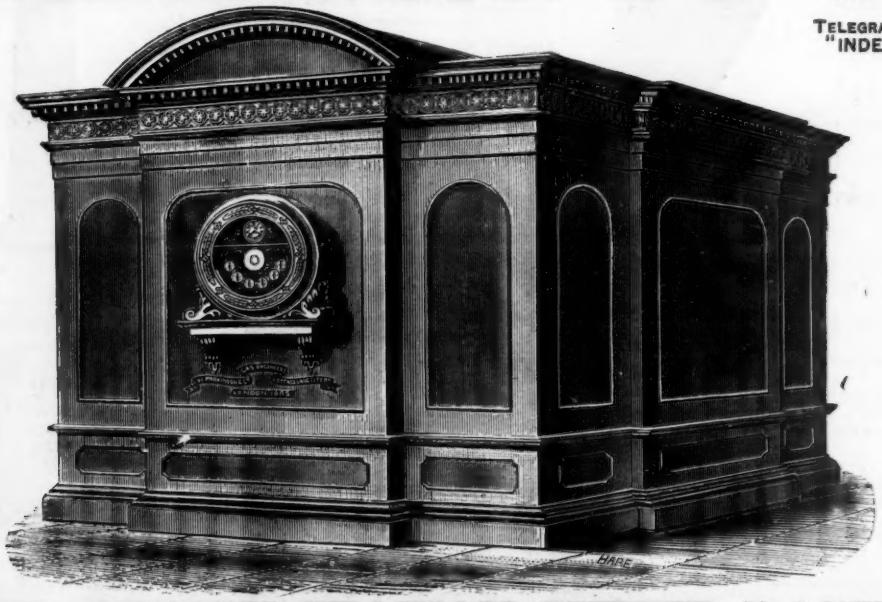

NEW DESIGN STATION METER (No. 2 PATTERN).

W. PARKINSON & CO. have introduced the above design of Station Meter in order to meet the demand for a more ornamental Tank. It is simpler in construction than No. 1 Pattern, and consequently less in cost. All joints are planed, the most modern improvements introduced, and the entire Meter is of the strongest and most substantial description;

FITTED WITH

PARKINSON'S PATENT THREE-PARTITION MEASURING DRUM.

MATERIALS and WORKMANSHIP of the VERY BEST QUALITY ONLY. PRICES, &c., ON APPLICATION.

Highest Award, Melbourne Exhibition.

[See also Advt. p. 269.

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THE
JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 11, 1890.

The End of the Great Gas Workers' Strike.

THE great South London gas strike has collapsed, after bringing much sorrow and privation upon upwards of 2000 retort-house hands and their families, for which the responsibility, such as it is, rests chiefly upon men like Thorne and Hutchins, who have not suffered the loss of a farthing by it. If we estimate that every one of these victimized workers represents an average household of four persons besides himself, which will not be far from the mark, it therefore follows that ruin has been brought very near to, and in many cases has actually come upon, 10,000 people as a consequence of the insane counsels of these "blind leaders of the blind." Wages amounting to something like £4000 a week have been diverted from their normal channels, and have passed into fresh hands. Families settled in London have been thrown out, and hundreds of immigrants have been brought into the already congested town. The savings of scores of labourers' lives have been squandered; many an old age has been stripped of its protection; many a sickly mother and child has been deprived of medicine and comforts; many a sober man has suffered the detriment of falling into a loafing way of life—and all for the sake of Hutchins and Thorne and their like. Begun in a mad strife for mastery; fostered by lies poured out from platforms week after week by those who well knew they were lying; supported by all the tyranny and intimidation that could be brought to bear by anarchists who chafed at the restraints of the law; maintained without hope as without faith by men who denied the fact, patent to the rest of the community, of their defeat—the strike has now come to an end. It was over, so far as the South Metropolitan Gas Company were concerned, from the moment when they manned their works with fresh hands. Week succeeded week, however, and still the strikers believed, or professed to believe, that their reinstatement as a body was merely a question of time. They held meetings and conducted negotiations as if they had been an organized body (in which pretension they were supported by a few of the less reputable newspapers), while the Company regarded them merely as so many men out of employment. If the conductors of these newspapers retain a modicum of grace—which is a very large assumption—they must be ashamed of having encouraged these poor misguided men in their hopeless resistance to superior justice, opinion, and power. Now there is no longer any pretence about the issue of the conflict. The men have been badly beaten, as everybody whose opinion is worth having in matters of the kind admits they deserved to be. The employer glories in Mr. Livesey's victory; the community feel reassured at the triumph of the forces of order over those of industrial and social anarchy; the experienced Trade Unionist is justified in the disparagement he has expressed regarding these men's principles and methods; and the workman may rejoice in the assurance that he is delivered at a blow from a crude tyranny that assumed to dispose of his life, free will, and means of livelihood. Too much importance should not be attached to the language of the confession of defeat, which is in the shape of an agreement between Mr. Livesey and certain of the men's representatives. These discredited and disappointed individuals wanted a bridge over which to retreat; and they went to the London Trades Council to get one made. This document was the result; and as it asked the Gas Company for nothing more than the men had before the strike, and has been open to them individually since, Mr. Livesey very good-naturedly accepted it for what it is worth, which is practically nothing at all. The Union gains by this settlement the excuse for stopping the payment of strike allowances, which in any case they would have been compelled to do this week for lack of funds. The men, unfortunately for themselves, obtain nothing by it, for the Company will soon be slacking off for the spring; and accordingly they only have the empty liberty of applying for work which cannot be found for them. Next winter the Company will have two sets of old hands to choose from, and they will naturally select the best. If any of the old regular hands are taken back, it will only be through the compassion of the foremen and superintendents. We do not doubt that these gentlemen, for whom no language has been bad enough on the agitators' platforms during the winter, will show compassion upon the most pitiful cases of the married men, and so return good deeds for evil words.

It is only possible to explain the action of the gas stokers (not only in South London but also in other places) who threw up their livelihood at the beck of agitators like Thorne and that bright specimen of a working men's representative, Michael Henry, by assuming that a wave of insubordination and unreason has passed through the land, affecting men's minds as strangely and uncontrollably as the prevailing influenza does their bodies. It is impossible to say to what lengths the movement would have gone, when it had gathered swing from Bristol, if it had not been so sternly checked at Manchester and in South London. We know that in London alone it was in contemplation to insist upon an increase of 25 per cent. in wages after the eight-hour business had been settled and the gas-works cleared of non-Unionists. Colonel Makins did not appear

to fully realize this aspect of the labour question when he mentioned the subject at the Chartered Company's meeting last Friday; but the Company may think themselves lucky that their last half-year's labour bill of £162,000 is not to be £200,000 for the current half year, as it would have been if Thorne and Hutchins had had their way. More than this, it is notorious that the work has not been so well done since the men began to think that Thorne was a greater man than any of their employers. From different parts of the country come the same reports of disaffection, noisiness, and disorder having raged in retort-houses, coincidently from the establishment of branches of the Gas Workers' Union, until within the past few weeks, when the discomfiture of Thorne and his fellows became painfully evident. This discovery, with its obvious moral—that the employers meant to be masters still, has had a wonderfully quieting effect in retort-houses all over the country, but especially in the Metropolitan district. Previously, a man could go to great lengths in the way of irregularity, as well as of downright insubordination, before arriving at such a manifest reputation for bad conduct that the Union could not defend him. The Union had, in fact, set up a fresh standard for workmen, independent of their efficiency with the shovel or the scoop and their character for steadiness and sobriety. This was their standing in the Union. It was seldom the keenest hand at a job of work that made the best spouter at branch meetings; and many a steady workman had to accept as branch President or Secretary the dominations of a man whom he would in the ordinary way despise. All this has been shaken by what has happened in South London. If the Union has not been "smashed"—not by Mr. Livesey so much as by the incapacity and bad faith of the Thornes, Hutchinses, Michael Henrys, and such like—its greatest power for evil has been destroyed for a generation.

Of Mr. Livesey's part in this good work we could say a great deal; but we prefer to cite the testimony of critics not connected with the industry, and who may naturally be supposed to have been unaware of the unique position occupied by Mr. Livesey in the estimation of professional brethren. It is not too much to say that Mr. Livesey's conduct in this affair, from beginning to end, has been no other than what was expected of him by those who knew him as the author of the sliding scale and the bold innovator in a score of the customary occupations of the gas engineer. He is the acknowledged leader of the British gas industry, let who will claim to come second; and there is not a gas manager in the land, who, feeling strife between order and anarchy in the works becoming imminent, did not rejoice within himself when he saw the forces of disorder ranged against the very strongest man he could have chosen to fight his battle. Others now know what Mr. Livesey is made of. The writer of *The Times*' leader on the collapse of the strike pays a high tribute to "the ability, "firmness and resource displayed by Mr. Livesey throughout "the struggle;" and admits that "with a less able and "resolute Chairman, the South Metropolitan Gas Com- "pany and the public might have fared very badly." Similarly, the *Standard* recognizes the "courtesy and con- "sideration for the men's feelings" which led Mr. Livesey to avoid inflicting any "unnecessary humiliation upon "the vanquished." Not for him the Roman triumph, which required the conquered to be dragged in chains at the victor's car. If he desired anything of the kind, a sufficient equivalent would be found in the grudging confessions of the *Labour Elector* and the *Star*, that all their frantic vituperations have proved useless against his ability and steadfastness. We gladly pass on from these considerations to a conclusion which will leave more pleasant thoughts behind it than any glorification of Mr. Livesey's victory, though never so well justified. It will be a satisfaction to Mr. Livesey's many friends to learn that up to the present time he has not appeared to suffer in health or spirits from the enormous strain he has had to endure during the past few months. The burden of so much extra work and greater anxiety, to say nothing of personal risk (which never weighed upon him for a moment), has not told upon him to any appreciable extent, if indeed it has not had a tonic effect upon his powers. If, after the approaching general meeting of the Company, at which he must give an account of the past vicissitudes of the undertaking, he should take a long rest and seek change of scene, to escape the reaction from the state of tension under which he has lived for so long, it will be only what his best friends would desire for him.

The Chartered Company's Meeting.

THE meeting of The Gaslight and Coke Company was held last Friday, and was a very satisfactory and interesting one. The arrangements of the great room at the Horseferry Road head-quarters of the Company are usually rather striking on these semi-annual occasions. The hall is a noble apartment, befitting, by its ample proportions, the largest Gas Company in the world, whose highest business is transacted within it. The Directors and their Secretary sit up aloft on an elevated platform at one end of the room, and are backed up by their chief officers in a style which the Governor (Colonel Makins, M.P.) would be the first to liken to an Exeter Hall conclave if he saw it from the front. He is given to sprinkling his official utterances with humorous remarks, not unfrequently of a sardonic cast. This time a curious effect was imparted to the assembly by the placing, immediately inside the door by which the proprietors had to enter, of a miscellaneous collection of gas apparatus, ranging all the way from burners to baths, which were effective enough in their degree, but did not improve the atmosphere of the hall. The little exhibition was a very good one, however, and well arranged; all the leading makers of gas apparatus being represented by their specialities. The attendance of proprietors was good, but not large. The Governor's speech, in moving the adoption of the report and accounts, is always patiently listened to; but this time he was rather longer than usual going through the figures of the accounts, and coming to the really interesting points of his discourse —the prospective extensions of the Company's plant, the labour troubles, and the result of the lawsuit with the South Metropolitan Company. The speeches of the few proprietors who took part in the proceedings showed clearly enough what topics had been uppermost in their minds. With regard to extensions, the Governor said the Directors contemplated spending £300,000 forthwith upon manufacturing and storeage plant, in connection with which water gas and inclined retorts will receive due attention. This was a more satisfactory piece of intelligence than a previous statement, to the effect that the Board had renewed their coal contracts on the top of the market, of which nobody took any notice. If the Company should be found to be fixed up with contracts at high rates when others are buying under them in the open market, it will look very funny to an observer of the constitution of the Board. When he came to deal with the labour troubles, Colonel Makins paid a handsome compliment to Mr. George Livesey, whose name was received with what, for such an assembly, must be considered tumultuous applause. Colonel Makins's tribute to his brother Chairman had best be read in its place in our report of the meeting. It was quite in accordance with the best traditions of English public life.

The last matter of moment—the result of the lawsuit between the two Companies—came like a discord in the harmony of the Governor's speech. He admitted that, on the question of damages recoverable under the judgment of the House of Lords, they had preferred a claim which the other side rejected as excessive, and that the difference between the two Companies is so serious on the point that they may have to go to law again to settle it. He professed to be willing to listen to any "reasonable" offer; but this term, of course, begs the whole question. Three proprietors deprecated the exaction of the "pound of flesh" from the South Metropolitan Company, who had not been convicted of bad faith in the matter; and notwithstanding that Shylock was present in the persons of a few proprietors, who clamoured for all they could get by forcing the letter of the law to the uttermost, it was evidently the sense of the meeting that the losers of the suit should not be penalized. Ultimately, there were many protestations of mutual good-will from the Governor and from Mr. Livesey, who supported the vote of thanks to the Board. It would be indeed welcome tidings if we could be assured that the feud between these great Companies had been stopped, and that, in spirit as well as in fact, the leaders on both sides had shaken hands over the prostrate corpse of the Strike Tyrant, slain by Mr. Livesey. Who is it that keeps them apart? Not Colonel Makins, he assures the world; nor Mr. Livesey, if we may credit his own asseveration. It

is not Mr. Phillips, who congratulated Mr. Livesey on his victory in a letter which was everything it should be. Is there anybody else behind—any "tail that wags the "dog?" If so, what was said and done in the meeting of Friday should be sufficient to paralyze any such influence, by showing that the proprietors as a body resent the querulousness, jealousy, little-mindedness, or whatever it is, that has hitherto prevented the Companies from working harmoniously together. If Colonel Makins and Mr. Livesey do not care to play Watkin and Forbes to the detriment of their respective Companies, they should show themselves strong enough to overcome the mysterious agency of Discord in their surroundings that has made them appear as enemies.

An Exposure of the Commission System.

THERE has been a slight recrudescence of the agitation on the subject of "commissions" in trade; and some articles on the subject have appeared in the *St. James's Gazette*, in which it is urged that Lord Randolph Churchill's Act has so far proved a dead letter, on account of the difficulty of setting the law in motion. There is a conflict of opinion upon this head, however; some people averring that the system is as rampant as ever, Act or no Act, while others declare that it has been "scotched," if not killed. The truth probably lies, as usual, midway between these conflicting assertions. Where members and officials of local authorities are thoroughly corrupt, as there is too much reason to fear may be the case in some instances, it is conceivable that they will not forego their usual plunder out of regard for an Act of Parliament which converted an old sin into a new crime. Such precautions against detection are taken in these cases, that discovery is extremely unlikely; and, of course, without discovery there can be no punishment. As old arrangements alter, however, and old stagers give place to new comers, to whom the method of doing the trick is not communicated, traders will have a means of escaping from this incubus, if they really and truly desire it. A good deal of light has been thrown on the subject of "tips" lately by proceedings in the Central Criminal Court in connection with the trial of two ex-employees of Bell's Asbestos Company, Limited, for what practically amounted to embezzlement. The defence was that the money was obtained from the Company's cashier for the express purpose of being spent in "tips" to benefit the trade of the firm. It was stated in evidence that from £3000 to £4000 a year had been paid out in this way by the firm, who, in the person of the senior partner, jeered at the idea of trade being done by any other means. The names of gas and water companies were freely bandied about in the course of the trial; and letters of instruction to travellers to pay particular attention to gas and water works managers, surveyors, and others similarly situated for influencing orders, were read out in Court. It was not denied that the money alleged to have been stolen was received by the accused; but the defence was that it was done openly according to instructions, and that the prosecution was a vindictive proceeding. In the event, the jury acquitted the prisoners; and with this verdict goes the condemnation of the firm's method of doing business. They claim to have reformed since the passing of the Commissions Act; and Counsel for the prisoners wished them "as much "prosperity under the new *régime* as the old"—in which aspiration we cordially join. The iniquity of the system is well displayed by such cases as this, when servants of a business firm are allowed to take almost any amount of loose cash they ask for, the application of which cannot, in the nature of things, be checked. Who is to say into what pockets this money finds a way? A traveller for a firm managed after this fashion may be the greatest thief out of gaol; but so long as he brings in orders no questions are asked, and the reputation of every buyer on his list is prejudiced. It is an unholy system altogether; and the more it is exposed and exploded the better it will be for the cause of honest trade.

Southern District Association of Gas Engineers and Managers.—The annual meeting of this Association will take place next Thursday, in the Whitehall Rooms of the Hôtel Métropole. The business will consist, as usual at the first meeting in the year, of the presentation of the Committee's report, and the delivery of his Inaugural Address by the new President (Mr. T. May, jun., Assoc. M. Inst. C.E., of Richmond). This will be followed by a continuation of the discussion on Mr. J. Methven's paper on "Photometry," read at the previous meeting; and at the close of the business the members will dine together.

WATER AND SANITARY AFFAIRS.

THE decision in the action brought by Mr. Ward against the Folkestone Water Company, a report of which appears in another column, will strike the non-legal mind as somewhat curious. Law and logic, it is to be presumed, should run together; but in this instance they appear to have been divorced. The Folkestone Justices it will be seen dismissed the information laid by Mr. Ward against the Company for having cut off the water supply to his premises because of his non-compliance with a notice requiring him to execute certain works. The Company were admittedly under the obligation to furnish a constant supply of water; but the law enabled them to prescribe the fittings to be used for the purpose of preventing waste. In this instance the Company required the consumer to insert in the communication-pipe a screw-down valve protected by a proper cover and box, to be laid flush with the pavement of the street. Mr. Ward was quite prepared and willing to carry out this requirement; but the Corporation of Folkestone (for reasons best known to themselves) intervened, and refused to allow the pavement to be broken open except by the Company, or by persons in their employ. Hence the deadlock, which resulted, first, in an application to the local Magistrates, who decided in favour of the Company, and, subsequently, in an appeal to Justices Cave and Smith, who have reversed the magisterial ruling. It could not be disputed that, for the purposes of preventing waste, the Company were empowered by their Act of 1858 to prescribe the pipes, cocks, cisterns, and other apparatus to be used by the consumer, and that for neglect to provide such appliances the water supply could be cut off in the usual way. Then, of course, there was the Water-Works Clauses Act of 1847, which confers on every statutory Company the power of breaking up streets for specified purposes; and on this point it may be remarked that it would appear to ordinary people not to make any great difference whether the Company sent their own men to open a street, or allowed the consumer to do so—the Company being responsible for any defect in the execution of the work. There was also another Act to be considered—namely, that by which, in the year 1888, the constant service was provided for as regards Folkestone, and by which Act the Company were empowered to introduce the very appliances which in this case they had required the consumer to affix to the communication-pipe. The real point of contention in the case was as to who could be compelled to pay for the use of this apparatus. The Magistrates found that the screw-down valve was necessary to prevent waste; but the Judges of the Queen's Bench Division seemed to think that a distinction was to be drawn between this apparatus and other similar waste-preventing appliances, because the screw-down valve was affixed in the service-pipe outside the house, and not within its walls. We should have thought that this made no difference to the principle involved, and that any waste-preventing apparatus required in such circumstances should be provided at the cost of the consumer, seeing that he receives the sole benefit derived from a communication with the main. But the learned Judges have decided that the Company's Special Act does not contain terms sufficiently explicit to fix the consumer with the cost of this particular apparatus. The case, therefore, goes back to the Justices with the Judges' opinion that penalties ought to be enforced against the Company. Whether the Company will rest content with this decision, or will carry an appeal to a higher Court, remains to be seen. If their Lordships' ruling stands good, the consumer will be entitled to the benefit of a constant supply of water without doing, as we should suppose he ought to do, all that may be requisite to prevent waste from the time the main is tapped for the exclusive benefit of his premises.

Engineering Appointments in the London County Council.—At last Tuesday's meeting of the London County Council, it was announced that Mr. Clement Dunscombe, who a few weeks ago was appointed Chief Engineer, in succession to Mr. J. Gordon, had sent in his resignation on account of ill-health. Before entering upon his duties Mr. Dunscombe took a voyage to the Canaries; but presumably the expected benefit was not derived therefrom. The engineering department of the Council is about to lose Mr. T. Lovick, who will shortly retire after a long period of service under Sir J. Bazalgette at the Metropolitan Board of Works. Mr. W. Santo Crimp, the Engineer of the Wimbledon Local Board, has been selected to succeed him

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 256.)

The Money Market still continues very hard; and there is no present sign of its giving way. The prolonged strain had last week a more marked effect on prices in the Stock Markets, and flatness was apparent in more than one department. The Gas Market has been very fairly active; and issues in general (with the exception of South Metropolitans) are steady and almost unchanged. The debenture and preference stocks of the Metropolitan Companies have been particularly brisk; much attention having been directed of late to these securities for investment. In Gaslights there have been moderate dealings daily in the "A" at level prices; the closing mark on Saturday (250½) being the best of the week, and the quotation showing an advance of 1. Nothing transpired at the general meeting on Friday to influence prices either way; in fact the issued report of the Directors had dealt with every subject, and left little to be said. South Metropolitans have fallen. For some time past there has been a good deal of speculation as to how the cost of the strike would be dealt with in the accounts for the half year; and by Wednesday it was freely rumoured that at least a very large proportion of the cost would be debited to revenue, and so disposed of at once and for ever, and that a corresponding reduction in the dividend would be recommended. Speaking with all reserve, not having the figures before us, we are disposed cordially to approve this line of policy. To face the loss at once, and wipe it out by foregoing a portion of the divisible profit, will strengthen the financial position of the Company, and consequently improve the value of its stocks. However, in the market the tendency was to offer stock, especially "A," with the result that it fell 10, and "B" and "C" fell 5. Present quotations are wide and nominal. A few transactions have been marked in Commercial. The old stock is 1 higher. A small quantity of new went very cheap; and the debenture is not too dear. There has been no business in Suburbans and Provincials; but Alliance and Dublin old is ¼ better. Foreign Companies present nothing remarkable; and the only change is a drop of ¼ in Continental Union. There has been more animation in the Water Market; and good prices have mostly ruled, but without actual advance. The Kent Company will meet on Wednesday, and declare the usual 10½ per cent. dividend.

The daily operations were: Moderate business in Gas on Monday, and prices were not remarkable. Nothing changed. On Tuesday, the condition of the Gas department was just about the same as the day before, at good average figures. Wednesday's Gas business showed no increase in volume, and prices were irregular. All Gaslight issues were good, and the "A" rose 1. Everything else dealt in could only command easier figures. South Metropolitan "A" fell 5; and "B," 2½. Water stocks were active and in good demand. The Gas market showed more life on Thursday. Gaslight secured issues were wanted. Commercial and Alliance and Dublin rose as noted above; but South Metropolitan "A" was sold freely, and fell 5 more. Buyers of "B" were 5 lower; and the "C" also fell 5. Water stocks continued active, especially New River debenture. Business in Gas was fairly good on Friday, and prices were better generally. On Saturday, the tendency was favourable; but all quotations closed without further change.

ELECTRIC LIGHTING MEMORANDA.

The Fortunes of the Taunton Electric Lighting Company—Electric Lighting Troubles in New York—Electricity in Berlin.

Among the places at which electric lighting companies are popularly reported to be doing good business is Taunton, where Mr. Massingham—the West of England parallel of Mr. Robert Hammond—succeeded a few years ago in starting a speculation of this order, which is at the present time used by these gentlemen and other electricians of their stamp as a decoy for bigger game. Deputations of local authorities all over England go to Taunton to learn about the Electric Lighting Company which pays 5 per cent., and which has already served as the parent of Companies at Bath and Exeter, and been otherwise extensively advertised all over the kingdom. The third annual meeting of this Company was held on Monday last week, when a report and statement of accounts, of which a copy has been sent to us, were presented and received. The report states that the "balance"—the word profit is carefully not used—for the year is "shown" to be £352 9s. 10d. The Directors accordingly recommended a dividend of 5 per cent., free of income-tax, which would take £352 9s. 5d. The neatness of this arrangement, whereby the dividend paid is just cleared by 5d. commands our admiration. The report mentions that the Company have been doing some temporary business in Bath, and that their Taunton station is being removed to a new site, where new machinery is to be laid down. So far good. When we turn to the accounts, however, matters do not look quite so smooth. The gross income of the Company for the year is set down at £2729, of which rents for lamps, sales of apparatus, and fitting work in Taunton stand for £1511; the Bath installations mentioned in the report are credited with £920; and the remaining £298 is entered to stock. On the other side, we find the expenses of the Bath work set down at £259; so that these foreign jobs alone, whatever their nature may have been, returned a clear profit of £660, whereas the balance on the year was only £352 in all. Dissecting the account, and so ascertaining the cost of carrying on the Taunton business without the adventitious aid of the casual jobs at Bath, it appears that the Company incurred a loss of £171 for the year on their home trade, although the rental from lighting was swelled by receipts for apparatus sold and installations carried out. Even this is only secured by omitting all charge for depreciation, which ought to be at least £500 by the Directors' own showing, seeing that they are actually replacing plant purchased three years ago. It is reported that at that time the Directors laid down steam plant at a cost of £1200 which is now being taken out, and for which they are to be allowed £300. Is this so, or is the rumour unfounded? If our information is correct, the depreciation on the steam plant alone for the past three years has been at the rate of £300 a year, to say nothing of the electrical plant. At any rate, unless we are corrected we shall continue to hold, from the evidence of these accounts and from the Directors' own admissions about the replacing of the machinery, that, so far from being justified in declaring a dividend of 5 per cent. on their working, the Directors of the Taunton Electric Lighting Company ought to own to a loss of something like 50 per cent. of the amount of their local revenue.

The removal of the overhead electric light wires in New York has stopped for a time the occurrence before the public eye of those tragic slayings and burnings which used to horrify the newspaper reader, and form such capital "copy" for the newspaper reporter. New York is not happy, however, in the electrical subways provided under the auspices of the Board of Electrical Control for the reception of lighting wires, which have no provision for ventilation, and consequently occasionally act as receptacles for an explosive mixture of air with the gas which escapes from the mains of the Gas Companies. This is a complication that nobody foresaw when the designs for the so-called subways were under consideration; and the local newspapers are therefore unable to reproach the authorities with overlooking what never occurred to their own omniscience. Seeing how prone the American newspapers are to arrogate to themselves the management of everything, and to assume that all knowledge rests with them, it is comical to observe how quiet most of them are about the shortcomings of the New York Board of Electrical Control, which they might have prevented if their foresight had been as good as everybody's hindsight. For there is no difficulty now in seeing that the so-called subways, being merely pipes without any ventilation, must act as receivers of any variety of air or gas that happens to be in the ground where they are laid. If they did not collect coal gas, they might act as conduits for sewer gas, and pour into the houses connected with them by means of electrical services all the abominable exhalations of a "made" subsoil. As we have already remarked when commenting on this trouble of the New York Municipality, it is a direct result of their carelessness in the past. They did not regard the safety of the public and the general interests of the community when gas and electric lighting were infants that could be trained in any desired direction. Consequently, they have been driven to adopt, at the eleventh hour, heroic measures which have not only been costly and vexatious, but—most irritating of all—appear destined to be absolutely useless.

Herr Rathenau, the President of the Berlin Electric Lighting Company, claims that the concern is doing remarkably well with a low-tension direct current of not exceeding 300 volts. He is a disciple of Edison, who holds that no other system should be permitted for the sake of public safety. Herr Rathenau admits, however, that even this low-tension current may cause fires, unless the indoor work is properly done. In Berlin the Company either do this work themselves, or allow it to be done by contractors under their supervision, and according to fixed rules. If done by the Company, the charge is £1 per lamp for the fitting, and 5s. a year for maintenance. The charge for current is on the rental system, at ½d. per hour for a 16-candle lamp. At these rates the Company paid a dividend last year of 8 per cent. This year the rental has been reduced by about 10 per cent., at which the Company still expect to make money. The price of gas in Berlin is about 5s. per 1000 cubic feet. The Company claim to have 80,000 electric lamps in use in the city, which number they hope to double within the year; and they have had no accidents. With regard to their profits, it may be remarked that, as with the generality of electrical concerns, they probably combine their earnings from fitting and lighting. The latter are large for a short time in the early history of many electric light companies. But what the financial newspapers would call a "frost" usually sets in after this outside work has been picked up; and thereafter the future of such speculations seldom comes up to the expectation of their founders.

Madame Alting-Mees has received a gold medal and membership diploma medal from the European Scientific Institution, for a pamphlet written in French on "Cooking by Gas." The issue has reached 32,000 in three months; and the authoress has been asked by a leading London Gas Company to translate her work into English, and offer it to them and gas companies generally.

THE DANGERS OF NATURAL GAS.

In a recent article in the *Chemical News*, Mr. F. Maxwell Lyte, F.I.C., F.C.S., discussed the subject of the dangers likely to arise from the abstraction from the earth of the large quantities of natural gas now used in America. As will be seen by the following extracts, Mr. Lyte is somewhat of an alarmist; still his views are not unworthy of attention.

The author commenced by considering what will be the effect on the strata from which natural gas is derived, as soon as it has all been used up, and when it falls to the ordinary atmospheric pressure. This, he thinks, must assuredly takes place sooner or later; and probably at no very distant period, considering how rapidly the gas is being squandered. The average pressure at which the gas issues from the wells is said to be about 200 lbs. per square inch, or 28,000 lbs. per square foot. An acre contains 43,560 square feet; and a square mile 640 acres. From these data may be estimated the supporting pressure by which the overlying strata must at present be upheld from below. According to the author's calculations, the gas would give a pressure which, for each square mile, would amount to no less than 358,436,571 tons—equivalent to the weight of a fair-sized mountain; so that on its ceasing to issue (proving thereby that the supporting pressure was withdrawn) the superincumbent strata would necessarily tend to give way. While the gas was there at so great a pressure, there must have been an enormous pressure upwards; and when it disappeared this would probably be replaced by a still greater downward strain.

The author next pointed out that underlying strata are already unable to support their own weight, even over a limited area, as evidenced by the serious depressions which occur in many places over abandoned coal mines; and most of the natural gas now being supplied is drawn from similar formations. Supposing the gas to be derived from reservoirs of gaseous hydrocarbons which have been liquefied by pressure, these reservoirs must have an unknown depth and area. If the area is small, no danger need be apprehended from the great depth at which they are situated; but if large, as is probably the case, the present or the next generation may be called upon to witness a catastrophe such as the world has never seen. That the size of such reservoirs must be considerable, may be concluded from the persistency with which the gas is disengaged always at the same pressure, and from the constancy of its composition. If the strata were to give way, the accident would probably be sudden, unexpected, and extensive.

This is rather an alarming picture; for, according to Mr. Lyte's views, the inhabitants of the towns drawing their supplies of natural gas from the ground below them may be unwittingly working their own destruction by the use of this combustible, and, while reposing in a fancied security, may be preparing for themselves an abyss ready to swallow them up with scarcely a moment's warning. It is to be hoped that his fears are without foundation, for such a calamity is almost too terrible to be contemplated. If there is a probability, or even a possibility, of such an event, it would be better to close at once all the existing gas wells, or, at any rate, those which would be likely to cause danger to a town. It may be added that in Pittsburgh alone there are 500 miles of mains for the conveyance of natural gas, which supply 40 iron-working factories, 37 glass-houses, 83 foundries and shops, 450 enterprises of various kinds, and 4628 private houses; the quantity of gas consumed being represented by an annual consumption of about 7,000,000 tons of coal.

Institution of Civil Engineers.—At the last monthly ballot of this Institution, Mr. J. R. Mosse Wright, of the Liverpool Corporation Water-Works, was elected an associate member.

Gas Lighting at the New Zealand and South Seas Exhibition.—At the New Zealand and South Seas Exhibition, which was opened in Dunedin on Nov. 26 last year, there has been a considerable curtailment of the gas supply as compared with the first two weeks. The consumption, at 3s. 6d. per 1000 cubic feet (the Company's charge to the exhibition authorities) then came to about £32 per night; but by an alteration in the lighting hours it has been brought down to £10 9s. The average cost during the exhibition is expected to be £12 per night.

The Influenza Bacillus in Vienna Water.—According to the Vienna Correspondent of *The Times*, Dr. Jolles, of that city, who studied for some time under the celebrated Dr. Koch, of Berlin, claims to have discovered specimens of the influenza bacillus in the Hochquellen water with which Vienna is supplied, and which has a great repute for its purity. His first analysis of this water was made after letting a tap run for half an hour, so that he might be certain to have water which had not stagnated in the pipes; and he then tested a cubic centimètre of the liquid, with the result that he found bacilli in it. As Dr. Jolles has not yet tried inoculation on any human patient, and a rabbit on which he experimented died from blood poisoning due to other causes, the publication of the discovery as a proved fact is somewhat premature. However, a rival to Dr. Jolles has already started up in Professor Weichselbaum, who, according to the *Tagblatt*, has also found the influenza bacillus.

THE POISONOUS QUALITIES OF VARIOUS KINDS OF ILLUMINATING GAS.

The recent unfortunate fatality by water gas at the Leeds Forge has been the means of eliciting a full *post-mortem* examination of the bodies of the victims, and the medical and physiological evidence offered at the inquests by Dr. Stevenson, Mr. Scattergood, Mr. Hargreaves, and other gentlemen who assisted on the occasion, will be frequently quoted as authoritative information on this important subject. It comes most opportunely at the present time, when active endeavours are being made in the way of introducing water gas, if not for general household use, at any rate in workshops and other places where the circumstances under which it is distributed will be very similar to those obtaining in the case of coal gas. It is useless to distort facts; and fortunately the agreement between the professional witnesses is so entire as to leave no question as to the effects of water gas or other mixtures rich in carbonic oxide, when inhaled into the human system. There will therefore be no excuse whatever for those who, in the future, may exaggerate the danger of water gas on the one hand, or the safety of coal gas on the other.

Illuminating gas, whatever its source, or the method by which it is prepared, consists mainly of three gases—hydrogen, marsh gas, and carbonic oxide. A variable proportion of hydrocarbons will be present—some in the form of permanent gases, others in the vaporous state; and there will also be small proportions of foreign matters—such as air, nitrogen, water vapour, and carbonic acid. Of these various substances, the only one at present proved to possess active poisonous properties is carbonic oxide. The proportion in which it is present varies considerably. Coal gas manufactured in the ordinary way usually contains less than 5 per cent. of it; but sometimes as much as 10 per cent. is present. Oil gas contains, if anything, a smaller proportion than coal gas. It is only present in comparatively large quantity when steam or air is admitted into the red-hot retort or generator where the gas is made, with a view of economizing material or increasing the yield of gas. The steam employed need not necessarily be introduced in a separate form. It may be generated in the retort itself, by the use of materials such as wood, which contains a large quantity of moisture. The air may be admitted directly or indirectly by the maintenance of a strong exhaust or vacuum in the retort. Increasing the degree of vacuum at the exhauster may augment the proportion of carbonic oxide in the gas by aspirating furnace gases through cracks in the retorts.

The action of gases on the animal system may be said to take place in two ways. It must be remembered that a proper supply of oxygen is necessary to the maintenance of life. Not only must gases of an actively poisonous nature be kept out of the lungs, but a sufficient quantity of pure air must be continually supplied to them. Therefore a gas such as nitrogen, which is quite inert so far as poisonous properties are concerned, may induce death by acting as an extinguisher, and keeping the necessary supply of oxygen away from the lungs. Just as an animal may perish either from starvation or from swallowing a poison, so its life may be destroyed either from want of oxygen or by the toxic action of some foreign gas breathed into the lungs. An animal in an advanced state of starvation may be restored to health by the judicious administration of food; and in a similar manner, if it is suffering by reason of an insufficient supply of oxygen, restoration rapidly follows when it is taken into the fresh air. In the case of a poisonous gas, however, just as with solid or liquid poisons, the effects of the poison remain to be eradicated after the actual administration or inhaling has ceased. This may be a matter of hours, weeks, or months, according to the peculiar property of the poison; or perhaps it may be entirely impossible.

In the case of a gaseous mixture containing a small proportion of active poison—such as coal gas, in which 5 per cent. of carbonic oxide is present—there are both these causes at work. The hydrogen and other inert gases tend to produce oxygen starvation; and the carbonic oxide begins to influence the blood. Whether the patient is killed by the one or the other will depend upon the proportion of inert as compared with poisonous gas. There is no evidence to show the actual cause of death in the case of poisoning by ordinary coal gas; but the evidence clearly demonstrates that, in the case of the Leeds water gas, the poisonous influence of the carbonic oxide was the source of the accident. In this, as in most other cases of poisoning by gas, the fatal agent was largely diluted with air; but it is shown by Dr. Stevenson's experiments that dilution to 0·5 per cent. does not prevent fatal consequences ensuing. It is evident that the active poisonous influence of carbonic oxide is very much stronger than the smothering effect exerted by inert gases. But there is another influence to be considered as applying to mixtures of hydrogen, marsh gas, and carbonic oxide; and that is the effect of diffusion. Hydrogen is the lightest gas known; and marsh gas is only one-half the weight of air. Carbonic oxide, however, is nearly as heavy as air. Gases diffuse in inverse proportion to the square roots of their specific gravities; so this property would be a favourable element in the cases of light gases, such as hydrogen and marsh gas. If escaping into

the open air, or into a large room, they would diffuse more rapidly than the heavier carbonic oxide. The same would obtain in the case of porous materials—such as ordinary brick-work or plaster; and there can be no doubt that many lives have been saved, in cases of poisoning by coal gas, simply on this account.

The evidence of Dr. Stevenson clearly shows that the effect of carbonic oxide on the animal system is of a terribly sinister kind. Like one charmed by the eye of a serpent, the victim rapidly loses the power of saving himself. We are reminded of the stories about worn-out travellers on the Alps, who go to sleep under the influence of the cold, and if left to themselves never wake again. Each atom of the gas inhaled into the lungs appears to take its proportionate share in the work of death; and thus the action is of a cumulative character. When the circulating system is fully charged with it, no subsequent action is of any avail. The rapidity with which this condition of things is likely to be reached will be dependent upon the percentage of carbonic oxide present in the gas. Professors Sedgwick and Ripley, of the Massachusetts Institute of Technology, found that when the gas-taps in a room were turned on, allowing ordinary coal gas to escape, it was difficult to get a poisonous atmosphere in respect to carbonic oxide. The gas escaped by natural ventilation; and not more than 3 per cent. of it would remain in the atmosphere of the room—which would represent about 0·2 per cent. of carbonic oxide. When water gas was tried under similar circumstances, the 3 per cent. of water gas represented about 1 per cent. of carbonic oxide. When a limit of about 0·5 per cent. of carbonic oxide was exceeded, they considered that a decidedly dangerous atmosphere was produced. The result of their experiments is that it is difficult to reach the poisonous limit with coal gas, but very easy to do so with water gas. The practical question is how to avoid the attainment of the dangerous limit, or at least to render it as improbable as may be.

Casualities which cause loss of life may be divided into three kinds—those due to recklessness, those due to ignorance, and those that are unavoidable on the part of the victim. Of these, the latter naturally claim the greater share of sympathy. The decease of the unfortunate warehouseman, who, in putting his hand upon an iron-bound package that was being lowered down to him, received a fatal shock of electricity from a conductor that had been frayed by the chain in passing, appeals more directly to our feelings than that of the electrical engineer who meets a similar fate by carelessly touching the wires of the dynamo machine under his charge. Recklessness and ignorance are very indefinite terms, meaning much or little according to the circumstances under which they are employed. So far as they apply to "accidents" in the way of explosion or poisoning by means of gas, it will not do to expect a very large amount of knowledge on the part of the public; and it would be very difficult to arrange matters so as to entirely prevent an occasional escape of gas. A tap may be turned by catching in the clothing of a passer-by. Hinges and moving parts will become dry and leaky from time to time. Distributing-pipes cannot be so arranged as to be absolutely beyond all risk of fracture or accidental perforation. So it is obvious that there is a limit in the scale of poisonous activity beyond which it is desirable that a gas supplied to the public, and laid on in all parts of our houses, should not extend. The poisonous activity of an illuminating gas will be a little, and only a very little, less than proportionate to the quantity of carbonic oxide contained in it; and therefore there is a great deal to be said in favour of the action taken in some States of America, in the way of prohibiting the presence of more than a certain percentage of carbonic oxide in illuminating gas. We do not go so far as to attempt to indicate how much that percentage should be, because that will always remain a matter of individual opinion, within certain limits. It will also be influenced by the circumstances under which the gas is supplied. But it is evident that a gas so highly charged with carbonic oxide as to be capable of overcoming the *vis viva* of the occupants of a small room, when escaping in consequence of an ordinary mishap—such as the extinction of a gas-flame, or the accidental turning of a tap—before they have a fair opportunity, by characteristic odour or otherwise, of becoming aware of the presence of a poisonous agent, cannot be characterized as "safe" in the ordinary acceptation of the word. If employed at all, it should only be with the aid of special precautions, and by persons acquainted with its properties. Such a gas might possibly be used for years with safety in large well-ventilated workshops; but when turned loose on the public by being distributed throughout a town in the usual way, it is impossible to guarantee that a certain amount of recklessness and ignorance will not be exercised in using it. Notwithstanding all that has been written and said on the subject of pure air, ventilation, &c., the general public remain wofully ignorant as to the elementary laws of the properties of gases; and therefore any gas that is said to be "safe" must conform to these possible conditions of usage. That it is "safe" when used by skilled persons in well-constructed buildings, is not a sufficient guarantee. To say that there is no difference between coal and water gas, as regards poisoning properties, is the same thing as saying that there is no difference between a 5 per cent. and a 1 per cent. solution of prussic acid. The stronger solution requires more care in using than the weaker; and cases of fatal mishap are obviously less likely with the latter than with the former.

WATER BILLS FOR 1890.

The Bills relating to water supply which await the attention of Parliament during the session that opens to-day, are neither so numerous nor so heavy as has been the case in some past years. Only four Bills relate to the incorporation of new Water-Works Companies. These are as follows: The Higham and Hundred of Hoo Water Bill is to incorporate a Company with a capital of £28,000, and power to borrow £7000, for the purpose of supplying water in the locality named, which is in the neighbourhood of Rochester. The supply is to be from a well in the parish of Higham, stored in a reservoir in the parish of Shorne. The rates for domestic supply are to range from 7½ to 5 per cent. The Mid-Sussex Water Bill is to dissolve and re-incorporate a limited Company authorized by a Provisional Order of 1888 to construct water-works for the supply of the Hayward's Heath district, with a capital of £35,000, of which £10,189 has been paid up. It is stated that the works, consisting of a well and pumping station, are in a forward state, and will be capable not only of supplying the district originally contemplated, but also an extended area. It is desired to increase the capital powers to £100,000, whereof £11,640 (being the amount represented by old shares issued, and fully or partly paid up) is to be regarded as original capital. One fourth of the amount of the old capital is to be borrowed at not exceeding 5 per cent. interest. Additional lands are to be acquired and works executed. The rates for supply for domestic purposes are to range from 7 to 5½ per cent., with 7½ per cent. for inns exceeding £15 annual value. The Newark-upon-Trent Water-Works Bill is to dissolve and reincorporate a limited Company formed in 1853 with a capital of £14,000. All this has been raised; and, in addition, the Company have a mortgage debt of £5650, besides owing £1500 on capital account. The capital of the new Company is to be £60,000, whereof £14,000 is to be regarded as original, and the remainder as additional capital, to bear a 7 per cent. ordinary or 5 per cent. preferential dividend. Power is sought to borrow £7000 in respect of the original, and £11,500 on the additional capital. The works are to consist of a culvert in the parish of South Muskham, and a reservoir on Beacon Hill. Rates for domestic supply are to vary from 8 to 5 per cent. The South Lincolnshire Fen Water (Spalding Water-Works Transfer) Bill, as the name implies, contemplates the transfer of a water-works undertaking authorized in 1860 from the Spalding Company to the other Company, who were incorporated in 1888 for the supply of a large district, including that of the Spalding Company, but were restrained from competing with the latter. The consideration for the transfer is to be a sum of £500 already deposited, a further deposit of £500 to be made within one month from the passing of the Act, and a payment of £20,110 15s. 11d. on Jan. 6, 1891, together with the discharge or taking over of the mortgage debt of £3400. Stocks are to be paid for at the time of transfer. A Director is to be chosen from shareholders resident in Spalding if possible. Power to raise £20,000 of additional capital and to borrow an equal sum is asked for.

The Airdrie and Coatbridge Water-Works Bill is to authorize the Company to raise £92,000 of additional 5 per cent. capital, and to borrow £23,000 in respect of the same, these borrowing powers not to be exercised until the whole of the new capital is taken up and one half of it paid. It is desired to convert the existing ordinary shares of the Company into 10 per cent. preference shares. Additional works are to be constructed, comprising three impounding reservoirs and subsidiary works to be completed within 7 years. Compensation water is to be discharged at the rate of 510,000 gallons daily into the Forrest Burn and 195,000 gallons daily into the How Burn. A delimitation agreement between the Company and the Glasgow Water-Works Commissioners is to be confirmed. The Canterbury Gas and Water Bill is to enable the Company to raise £25,000 of additional water capital to carry an 8 per cent. dividend. The dividends on gas and water capitals may be uniform. The Pontypool Gas and Water Bill is to enable the Company to raise £40,000 of new capital with power to borrow £10,000. The limits of supply are to be extended and the works to be enlarged by the construction of a new pumping-station and reservoirs. One-fifth extra on the authorized rates for domestic supply is to be chargeable for high service. The Newcastle and Gateshead Water Bill is to enable the Company to raise £120,000 of new capital to bear a 5 per cent. dividend, with power to borrow £30,000. Additional lands and waters are to be acquired and certain works constructed within 10 years. The Ystrad Gas and Water Bill is to authorize the Company to raise £90,000 of additional capital, with power to borrow one-fourth of the amount. The water-works are to be enlarged by the construction of another impounding reservoir on the Rhondda Fawr River, a pumping-station, and other works. The rate for domestic supply is to be 6 per cent. for property of above £20 annual value, and for other values in proportion.

The Baildon Local Board Bill is to enable the Board to enlarge their water-works, originally constructed in 1857, by the addition of a reservoir, &c., under certain provisions relating to the supply of compensation water, to be completed within 10 years. The sum of £16,000 is to be borrowed for this purpose.

The Bilston Commissioners (Water) Bill is to empower the Commissioners, who at present buy water from the Wolverhampton Corporation, to construct water-works of their own; the source of supply being wells to be sunk in the parish of Wombourn, Staffordshire. The obligation of the Wolverhampton Corporation to supply the district with 220,000 gallons of water daily is to be retained. The Commissioners require to borrow £20,000 for water-works purposes. The Commissioners desire leave to retain out of the surplus revenue, if any, from their water undertaking a sum not exceeding £1000 a year for the purpose of meeting any extraordinary expenditure arising in connection with the undertaking. The Birkenhead Corporation Bill is to amend an Act of 1881 by extending the time allowed for the completion of works authorized by that Act. The works are to be modified also, with the consent of certain parties. The limits of water supply are to be extended; and the powers of the Corporation for the recovery of rates from owners and occupiers of cottage property are to be enlarged. The Bradford Corporation Water-Works Bill recites that for the supply of water to the borough of Bradford, and a large number of surrounding districts forming the centre of the worsted trade of the country, the Corporation have been empowered to borrow £2,631,900, of which they still owe £2,520,083, or thereabouts. They now desire to construct additional works at a cost of £1,230,000, comprising four storeage and compensation reservoirs on the River Nidd and other works eleven in total number. The Nidd millowners are to be organized into a Board for the control of the compensation water. The Derby Corporation Bill is to enable the Corporation, among other things, to enlarge their water-works by the construction of a pumping-station, filter tunnels, &c., acquiring additional land for this purpose. The works are to be completed within 15 years; and the sum of £200,000 is to be borrowed for their construction. Permission is desired to license plumbers in the borough. The Dewsbury and Heckmondwike Water Bill is to extend for a further period of 10 years the power for the construction of water-works granted in an Act of 1870. The Huddersfield Water-Works Bill is to authorize the transfer to the Corporation of Huddersfield of the water-works now belonging to the Wessenden Commissioners, and to empower the Corporation to make additions to their own water-works, comprising a reservoir to be substituted for the Booth Reservoir authorized by the Act of 1871. Compensation water at the rate of 3033 gallons per minute is to be discharged down the Wessenden brook during the working hours of every week day. The Corporation desire to borrow £500,000 for the purposes of the Bill, besides an amount sufficient to pay interest on the cost of land and outlay for works in hand until the new reservoir is completed. The Leicester Corporation Water Bill is to enable the Corporation to enlarge their water-works by the construction of a pumping-station, reservoirs, and other works, to be completed within ten years. The sum of £270,000 is required for this purpose; and the Corporation seek to borrow £50,000 in addition for other water-works purposes, and to sell a parcel of redeemable stock representing their interests in the old undertaking of the Water Company. The Liverpool Corporation Bill contains a clause contemplating borrowing as part of the water-works capital an amount equal to the interest paid on the Vyrnwy works while in course of construction. The charges for water supplied within the borough of Bootle are to be equalized to those prevailing within the City of Liverpool. An agreement between the Corporation and the Liverpool Hydraulic Power Company is scheduled in the Bill. The Morley Corporation Water Bill is to empower the Corporation to construct a reservoir to impound the water of the Withens Clough, to be completed within 7 years. Compensation water is to be discharged at the rate of 400,000 gallons daily. Rates for domestic supply are to range from 12 to 6 per cent. The sum of £100,000 is to be borrowed for the purposes of the Bill. The Plymouth Corporation Bill is to enlarge the borrowing powers of the Corporation by £50,000, for the construction of an impounding reservoir upon the River Meavy and Harter Brook, to be completed within 7 years. The Stockton and Middlesbrough Water Bill is to extend the time allowed by an Act of 1888 for the construction of certain works. Lapsed compulsory powers for the purchase of certain lands are to be revived; and authorized works are to be modified. The quantity of water allowed to be drawn from the River Tees is to be increased from 66 to 70 million gallons. A clause is inserted directing the Arbitrator, in the event of any sale of a portion of the undertaking to a local authority, to take into account the sums paid by the Joint Board to the old Company for compulsory sale and prospective value. Certain fishery clauses of older Acts are to be altered. Cisterns may be required if high service is demanded for dwelling-houses. It is desired to borrow money for the payment of interest on the value of works in construction. The Corporation of Stockton require to borrow for the purposes of the joint undertaking £163,450; and the Corporation of Middlesbrough are to borrow £196,140. The Tunbridge Wells Improvement Bill contains clauses making water rates payable in advance, and providing for the establishment of a renewal fund. The Warrington Extension Water and Improvement Bill is to empower the Corporation to require the Company to sell their undertaking for a lump payment or for annuities. The Wessenden Reservoir Bill is to authorize the Commissioners of the Wessenden Reservoir to construct new works, consisting of an additional reservoir near the existing one; and to borrow £95,000 for the purpose. It is proposed to sell water in bulk to the Huddersfield Corporation at a rate not exceeding 6d. per 1000 gallons. Profits and losses are to be shared among the owners of falls on the Wessenden Brook and River Colne. This Bill is in opposition to that of the Huddersfield Corporation, which proposes to acquire the Wessenden Water-Works property for the benefit of the people of Huddersfield.

The Proposed Central Electric Station in Brussels.—The Municipality of Brussels are not making very rapid progress towards the settlement of the question of the establishment of the central electric lighting station for which they some months since invited proposals. The Committee who have the matter in hand are specially considering two of the tenders—that of M. Van Bysselberghe, who proposes to transmit energy by means of water at a pressure of 50 atmospheres; and that of the Electric Lighting Company of Liége, MM. Siemens and Halske, and the Allgemein Berliner Electricitäts Gesellschaft, who purpose supplying the current directly by cables. These projects the Committee consider possess certain advantages over all the others submitted to them; but they do not seem to be able to make up their minds to adopt them definitely. According to present proposals, the centre of the city is to be entrusted to the German Company; the higher portion (the more residential parts) to M. Van Bysselberghe. We learn from a Brussels correspondent that this gentleman does not lose an opportunity of advertising his scheme through the medium of the press; while his supporters urge his nationality as a reason for entrusting him with the entire work of lighting the city, in preference to Germans. It is stated, however, that his system has been tried in Austria and Switzerland, and been abandoned owing to the serious inconveniences to which it has given rise. The partisans of the German Company contend that the lighting of the city should not be entrusted to the projector of an untried system, and that it would be very indiscreet on the part of the Municipality to allow him to experiment with it for an installation of the magnitude of the one proposed. The other competing firms are by no means satisfied at the position of affairs; as they assert that they were misled in regard to what they were to tender for. This question has therefore stirred up no little commotion in the city; and the Municipality will have some trouble in arriving at a decision satisfactory to the general public. Possibly the end of it all will be that they will put up the station themselves, and have it worked under their own superintendence.

The Dangers of Electric Wires.—In the JOURNAL for the 28th ult. we reported a fatal accident to a man at Newburgh (N.Y.), through an electric wire. He had tied his horse to an iron post upon which lay a sagged wire carrying a 1000-volt alternating current. The horse put his nose against the post, and dropped to the ground. The man went to the horse's assistance, and, falling against the post, received the full force of the current, and was killed on the spot. It appears that the friction of the wire against an iron bar had destroyed the insulating material, and allowed of the current being passed into the post. At the coroner's investigation into the circumstances, it was stated that a wire had been reported "grounded" about two hours before the accident; and it looks like negligence that it was not attended to. The wire was part of the Westinghouse Company's service; and the fatality caused a clamour to be raised for the removal of all their overhead conductors. The Coroner (Mr. J. Corwin) expressed his intention of thoroughly investigating the matter. At Pittsburgh, on the morning of the 23rd ult., a "dead" telephone wire fell across the wires of the Pleasant Valley Street Railway Company, and, according to a New York paper, "treated people to a rare electrical display." A large crowd assembled to witness the antics of the wires. Sparks of fire flew in all directions, melting the snow and burning all the wood with which they came in contact. The loosened wire, we are told, "wriggled around like a fiery serpent;" and the bright flashes of electricity were to be seen at a distance of two squares. The wire burned through in a few minutes, fell to the ground, and the danger was over. Fortunately no one was injured. A similar accident occurred in another section of the town about the same time, when a broken wire fell across the electric light lines. For a time there was a "dangling streak" of electricity in that neighbourhood. One man attempted to take hold of the wire to throw it out of the way; but he was held back by another who had his wits about him. The foregoing are the latest recorded disasters resulting from electric wires. The question has arisen as to their being pure "accidents." The London Correspondent of the *Irish Times* says there is an insinuation abroad that the fatalities reported from time to time from America as having resulted from contact with exposed electric wires, are really and truly the invention of an enemy which is no other than the gas interest; the impression being that "jealous rivalry has been trying to handicap a young competitor by giving him a bad name to begin with." This, however, would not apply to the case of the lineman who, while repairing an electric wire at Cincinnati early last week, received an electric shock, causing him to fall from the pole to the ground, a distance of 30 feet, whereby he sustained fatal injuries.

NOTES.

A New Type of Steam-Engine.

A curious hybrid type of motor has been invented by Mr. Henry Turner of Liverpool, and is described by Mr. J. W. C. Haldane, in a recent work on "Civil and Mechanical Engineering." It is a steam engine with the cylinders also arranged to do duty as air-pumps for supplying forced draught to the furnace. The model first made was applied to a yacht, and had two cylinders 6 inches and 17½ inches in diameter, and 10½ inches stroke. The cylinders are single acting; one side being left free for drawing and forcing air, which is taken from the tubes of a heater placed in the uptake of the boiler leading to the funnel. Consequently, the cylinders are kept so hot as to prevent condensation of steam, while the hot blast makes the furnace exceptionally efficient. On a trial, this engine developed 54·29 horse-power, with a coal consumption of 66 lbs. per hour. The evaporative duty was 11·4 lbs. water per pound of coal; and the power was developed at the cost of 1·215 lbs. of coal per indicated horse power per hour. The furnace was smokeless during the trial. It is believed that with larger engines on the three-crank plan, with a higher ratio of cylinder areas, the coal consumption of engines on this principle will not exceed 1 lb. per indicated horse power per hour. Indeed, less is even hoped for, from results obtained when the model engine was run at 480 revolutions per minute. High-speed economic engines are in demand for the direct driving of electric light machinery.

The Flow of Ponderable Fluids.

M. Parenty, Engineer of State Manufactures at Orleans, has submitted to the Société d'Encouragement a communication on the regulation and measurement of pressures, and the discharge of all ponderable fluids. The formula $D = m w \sqrt{2g} H$ for the discharge of heavy fluids through orifices, as a function of the loss of head or the generating height H, is a simple approximation generally very sufficient for practical requirements, when it is a question of incompressible liquids. For perfect gases, on the contrary, and *à fortiori* for the vapour of water, the phenomenon of expansion is complicated by thermic phenomena, the importance of which increases rapidly with the importance of H. It is necessary to take account of these perturbing causes in order to establish a completely rigorous formula, which is done in two typical hypotheses, isothermal or adiabatic, according as the fluid borrows or does not borrow heat from exterior objects. In the case of extremely small losses of heat, fluids without compression may be assimilated to incompressible fluids, and the problem of discharge becomes united with that of pressures. M. Parenty exhibited a series of practical appliances governed by the theory of the flow of ponderable fluids. Among these, for illuminating gas, was included a consumers' regulator with compensation for pressure; affording a rigorously constant pressure at the commencement of a service or on a trunk main. He also showed a regulator with surcharged pressure, giving an automatically increasing pressure proportional to the number of burners turned on; and also the discharge meter, permitting the formula to be experimentally tested in the case of gas. For steam measurement, M. Parenty exhibited a meter with compensation for density, giving at any instant the discharge in weight of any main steam-pipe. This instrument was used successfully at the Paris Exhibition.

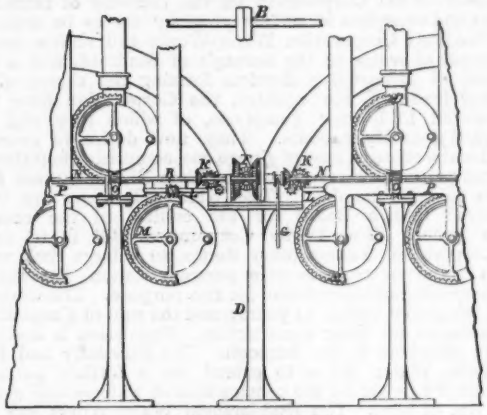
The Evaporation of Lancashire Boilers.

A paper was recently read by Mr. Michael Longridge before the Manchester Association of Engineers on "Evaporation in Lancashire Boilers," in which much information was given on the subject of boiler performances as well as on boiler testing. The author's principal object was to explain how boilers of this type may be designed for the work they are required to do, and to this end it was necessary to treat of the correct method of ascertaining evaporative results. To do this properly is no easy task, as Mr. Longridge admitted; involving as it does calorimetric and chemical investigations of fuel and ashes, and much accurate measurement and calculation. The paper, however, contains several tables and diagrams likely to be of assistance to engineers in solving problems of this kind, and concludes with a few practical hints to boiler owners which embody Mr. Longridge's experience in steam raising. These are, to get boilers designed for the work they have to do, and not to follow conventional sizes; to abandon 6-feet grates if a shorter length is required to burn the coal at a rate of from 16 lbs. to 21 lbs. per hour; to reduce the draught as much as the nature of the fuel will permit; to obtain dry fuel and keep it dry, weighing the ashes that come out as well as the fuel that goes into the furnaces; to carefully stop all air-leaks in the boiler setting; to fit up a gasholder for collecting gases from the chimney, and to aim, by reducing the draught, at keeping the proportion of carbonic acid up to 10 or 11 per cent. The hotter the furnace the better; and if it could be made hot enough, by regulation of the draught, to melt a piece of steel boiler-plate, it would be found very effective. Mr. Longridge describes the Lancashire boiler as a slow-motion machine, not to be compared to a locomotive boiler; but such as it is he believes it to be nearly perfect, and not susceptible to material improvement.

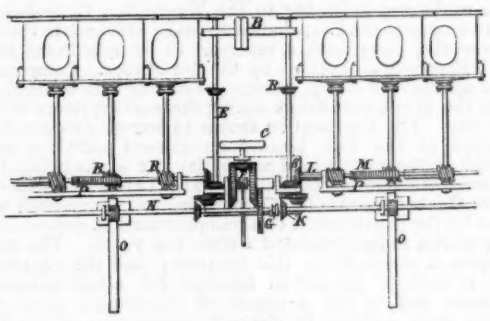
TECHNICAL RECORD.

ELLIOTT'S PATENT CONTINUOUS CARBONIZING APPARATUS AS WORKED BY POWER.

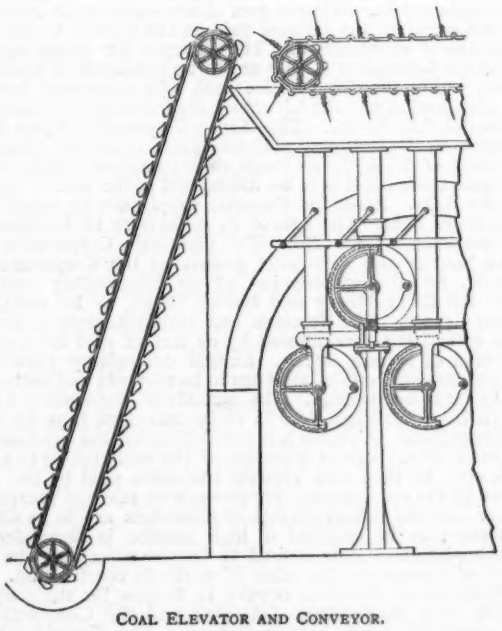
Through the courtesy of Mr. J. Elliott, Engineer and Manager of the Ludlow Gas-Works, we are able to-day to give illustrations and a description of his apparatus for the continuous carbonization of coal, as operated by power. It will probably be remembered that Mr. Elliott's system was fully described in the last volume of the JOURNAL (pp. 127, 876). With regard to the present arrangement, it may be mentioned that the idea is to work simultaneously four settings of fives; each retort receiving 56 lbs. of coal. It is estimated that two men would be



FRONT ELEVATION.



PLAN.



COAL ELEVATOR AND CONVEYOR.

able to charge the 20 retorts with 10 cwt. of coal and draw the coke in the space of three minutes at the outside. The first stack disposed of, the men would pass on to the next stack of 20 retorts, and draw and charge them; and so on. The men, in other words, would charge the first group of four settings;

then go to the next; and so keep on till the 20 groups of four settings were charged. This Mr. Elliott estimates would take the two men half an hour; the other half hour being employed in oiling and other little matters.

As already stated, the illustrations show the apparatus as worked by power. This is obtained from an engine (preferably gas) stationed at one end of the retort-house. The main shaft B runs the entire length of the house in a line with the benches of retorts. One standard D is required for every four settings; the retorts in these settings being charged simultaneously. Power is transmitted from the main shaft to the pulley C; the action of the apparatus being as follows:—The shaft N is put in motion by the clutch F; and by means of the racks and pinions the cross-heads P P and scoops are caused to advance till the bevel-wheels S run into gear with the bevel-wheels R. The lever G is now moved; thus throwing the racks O O and pinions out of gear. At the same time the spindles E are put in motion by means of the bevel-wheels K. The spindle L will now revolve; and, by means of the worms and semicircular wheels, will turn the scoops over—thus depositing the coal in the retort. The lever G is then moved back; throwing the spindle E out of gear, and at the same time putting the racks and pinions in gear. The motion of the shaft N is reversed by means of the lever and clutch F; thus causing the cross-head to return to its original position. The spindle E is again thrown into gear in the manner already described; and this causes the scoops to assume their normal position, ready to receive the next charge of coal. The coke cylinders are made to turn over and discharge their coke simultaneously; the power being obtained from a shaft running above. The hoppers of the different settings are in a line and joined together, so that the conveyer will take the coal from the elevator to the end of the series of settings; and so keep the hoppers continually charged with coal.

Death of Mr. T. Forstall, of Chicago.—Mr. Theobald Forstall, President of the Chicago Gas Company, succumbed on the 19th ult. to an attack of influenza. The deceased gentleman, who was an ex-President of the American Gaslight Association, was 63 years of age.

New Zealand Coal.—In the Greymouth Court at the New Zealand and South Seas Exhibition in Dunedin, there is a fine exhibit by the Grey Valley Coal Company of samples from their Wallsend, Brunner, and Coalpit Heath Collieries—including gas, steam, house, and smithy coal; also small coal, as prepared for coke making; samples of coke for smelting purposes, as manufactured at the Company's coke works at the collieries; and fire-clay goods, including bricks of all kinds, plain and fancy stove tiles, gas-retorts, and raw and ground clay. The Brunner coal has a high reputation for gas-making purposes.

Gas Undertakings in South Australia.—In the JOURNAL for the 1st ult. (p. 18) we referred to the Bill which had been introduced into the South Australian Legislative Council with the object of conferring upon municipal bodies the power to supply gas and electricity for lighting purposes in competition with established private undertakings. It will be remembered that a petition was presented by the South Australian Gas Company asking for the insertion of a clause directing that, before competing works were set up, negotiations should be entered into for the acquisition of those already in existence, on the basis of an 18 years' purchase of the net profits. The whole matter was referred to a Select Committee, who called before them three witnesses—Mr. F. Ayres and Mr. J. Evans, the Solicitor and Secretary respectively of the Gas Company, and Sir E. T. Smith, K.C.M.G., a former Mayor of Adelaide, who had studied the question of the municipal ownership of gas undertakings. The evidence given by the last-named witness consisted mainly of the citation of statistics in regard to the gas supply of Walsall (Sir E. Smith's native town); and a comparison of them with those relating to Adelaide, with which it corresponds fairly well in area and population. We shall probably take an early opportunity of making some extracts from the evidence laid before the Committee; but, in the meantime, we may say that it only served to open their eyes to the difficulties of the question that they had to investigate. Consequently, after two sittings, the Chairman (the Hon. R. C. Baker) reported to the House, on Dec. 5, last, the result of the inquiry so far, and recommended that, in view of the advanced period of the session, it should be continued by a Royal Commission. He confessed that the more the Committee considered the proposals contained in the Bill, the more had difficulties presented themselves. They found that it was the universal practice in the United Kingdom to prohibit corporations from supplying gas to any city or borough where a private company had formerly supplied gas, unless they first bought the company's works; for the simple reason that competition meant dear gas to the consumer and ruin to the producer. Sir E. T. Smith, while admitting that it was only right and proper that corporations should supply their own gas, had expressed the opinion that where a gas company were already in possession of the ground, the corporation ought first to buy them out—the only question being fair terms. The Committee thus considered they had good reason for recommending the appointment of a Commission to deal with the question during the recess; and this was agreed to.

SOCIETY OF ENGINEERS.

The First Ordinary Meeting of this Society for the current year took place on the 3rd inst. at the Westminster Town Hall, when the retiring President (Mr. Jonathan R. Baillie, M. Inst. C.E.) presented the premiums awarded for papers read during last session. Among them were the Bessemer Premium, to Mr. S. Griffin, for his paper on "Modern Gas-Engine Practice;" and a Society's Premium to Mr. H. Faija, for his paper on "Forced Filtration of Water through Concrete." These communications were noticed in our columns when they were presented. The other awards were a Society's Premium to Mr. G. R. Strachan, for his paper on "The Construction and Repair of Roads;" and the President's Premium to Mr. G. M. Lawford, for his paper on "Fireproof Floors." A vote of thanks for his services during the past year was then accorded to Mr. Baillie, and he vacated the chair, after having introduced the new President, Mr. H. Adams, M. Inst. C.E., who proceeded to deliver his Inaugural Address.

After thanking the members for the honour they had conferred upon him in electing him to the presidential chair, Mr. Adams briefly alluded to the satisfactory position of the Society (which now numbers 417 members of all classes), and mentioned the loss by the death of Dr. Percy, and the addition of Earl Granville, Lord Armstrong, Lord Brassey, Sir W. Thomson, Mr. W. Anderson, and Mr. B. Baker to the roll of honorary members. He commented on the principal points of the papers read during the past session, and described the features of interest in the works visited by the members during the vacation—including the East London Water-Works, the Sewage Outfall Precipitation Works at Crossness, the central station of the London Electric Supply Corporation and the Foreign Cattle Market at Deptford. The President then referred to the progress of technical education, noticing particularly the work of the Science and Art Department, and that of the City and Guilds of London Institute. Remarking that a wider field of enterprise than that contained within the shores of the United Kingdom is necessary for engineers, he gave statistics showing that about 30 per cent. of the English engineers are now practising abroad, and spoke of the advantages to be derived from the realization of the idea of Imperial Federation. He then referred to the enormous strides being made in ocean navigation, and gave certain particulars as to the 8,000,000 tons of British shipping, with details of a few recent performances. The extended use of mild steel and some of its disadvantages were noticed; and the President then passed on to a consideration of our fuel supply. He expressed the belief that the days of coal are surely numbered, and that it behoves us to seek other means of generating power—in the meantime practising the greatest economy in the use of the mainstay of England's prosperity. Under the head of railways, some figures were given showing the vastness of the traffic upon them. Several large bridges were described—the Forth Bridge, of course, occupying the place of honour; and references were made to many other engineering works and processes which have occupied public attention. In conclusion, attention was directed to the necessity for specialization in the studies of engineers; the multifarious sub-divisions of engineering science rendering it physically impossible for one man to thoroughly master more than one or two branches. Hence the necessity for the existence of such bodies as the Society of Engineers, where experiences could be freely exchanged. A final exhortation to the members to wear out rather than rust out, brought to a close an able and interesting address.

NATURAL GAS IN INDIANA.

A recent number of the *American Manufacturer* contained the following article on the subject of the natural gas supply in Indiana.

A tour through the Indiana gas belt and its pipe-line cities and towns, reveals several facts worth remembering. First, that the Indiana field is larger than any other yet discovered, and the area of territory fed from it greater than any supplied from any other natural gas source. Secondly, judging from the location of the field, the lower initial pressure of the gas, and the slower consumption of the supply, it is likely to last longer than any other gas territory thus far found. Thirdly, comparing it with any other field yet developed, it has brought more wealth, a larger access of population, and greater comfort and convenience to this commonwealth than have come to all the other States in the Union combined from the finding of natural gas inside or outside of their borders.

Something like 400 miles of pipe-lines have been completed, including those supplying the city of Indianapolis from the Hamilton County field. Of the Indianapolis lines, the Consumers' Trust has about 74 miles of pipe-line; and with its 9000 connections, supplies about 35,000 people. Its pipe-line includes 30 miles of 8-inch, 14 miles of 10-inch, 12 miles of 12-inch, and 18 miles of 16-inch pipe; and it has about 115 miles of mains, varying from 16 to 3 inches in diameter. The Indianapolis Natural Gas Company has 35 miles of pipe-line; and with 5000

connections, supplies 20,000 people. Its pipe-line includes 6 miles of 6-inch, 8 miles of 8-inch, and 21 miles of 12-inch pipe; and its mains extend over 60 miles. The two Companies combined supply 55,000 domestic consumers, at a saving over former coal bills of $250,000 annually; and up to a comparatively recent period, each supplied about 150 factories and public buildings, with an annual saving, as compared with former coal bills, of more than $100,000. The other completed pipe-lines in the State vary in length from 5 to 48 miles; and in diameter from 2 to 12 inches—the majority of them averaging 8 inches. Upward of 20 cities and towns of the State, with an aggregate population of 260,000, are supplied with pipe-line service; and if the places supplied directly from the well are added, the list will be increased to 71 cities and towns, with an aggregate population of 411,000 in round numbers.

Placing the calculation on the basis that one-fourth of the population in districts supplied with natural gas are consumers, it would give the State upward of 100,000 municipal consumers, with an approximate annual saving over the former fuel of $3,000,000. The saving to manufacturers in the four cities of Muncie, Anderson, Marion, and Kokomo alone totals up to $1,045,000 a year; and if the savings of all the other State manufacturers using gas fuel did not exceed another million, it would make up a total of $5,000,000 a year as the amount of the saving effected by the new fuel to the people of the State—saying nothing about the increased comfort and incidental advantages which attend its use.

A good many explanations have been given concerning the difficulties found in forcing natural gas through long pipe-lines; and many theories have been put forward based on atmospheric changes, heat, cold, &c. The latter have come to be rejected by practical operators who are engaged in the business. They say that neither heat nor cold in the atmosphere can affect the gas in the ground at the depth from which it is taken; that when moving through the pipe-line, it carries warmth sufficient to melt snow, if a hole is dug and the snow laid on the outside of the pipe, in the coldest weather; and that even if the temperature of the gas were lower than the pipe-line, the gas would only suffer a slight condensation that would make it move the faster. Initial pressure and friction in the pipe are the only factors admitted into the calculation. When, by lengthening the pipe, enough friction is caused to overcome the initial or rock pressure at the first end of the pipe, no gas is delivered at the other end. When the pipe is shortened, the gas is delivered at the farther end, with a pressure reduced in exact proportion to the distance travelled and the resistance encountered from friction. Starting with 600 lbs. pressure at Sheffield (Ind.), gas is delivered at Buffalo, 90 miles distant, with a pressure of less than 100 lbs. Starting with gas at 300 lbs. pressure at Chesterfield (Ind.), it gets to Richmond, 45 miles away, with less than 100 lbs. pressure. This is the argument of the operators, briefly stated; and it seems reasonable.

THE FLOW OF WATER IN OPEN CHANNELS AND PIPES.

At a recent meeting of the Institution of Civil Engineers of Ireland, Mr. R. Manning, M. Inst. C.E., a Past-President, read a paper on the above subject. An abstract of the communication has lately appeared in the *Engineer*, to which we are indebted for the following particulars.

The author began by referring to the importance, to the civil engineer, of a knowledge of the numerous subjects comprised in the comprehensive title of "Hydrology;" and went on to remark that although the science of hydraulics is now nearly 250 years old, it is less than half that time since anyone could calculate, even approximately, the velocity or surface inclination of water flowing in an open channel of given dimensions. At the present day great differences of opinion exist among writers on the subject; each investigator claiming some excellence over those who preceded him, or roundly stating that the rule proposed by him is the only correct one. Anyone who has carefully studied the subject must have come to the conclusion that it is almost hopeless to obtain a strictly mathematical solution of the problem, and that even to observe and record correctly the physical data required is a matter of extreme difficulty, not to say impossibility. On the other hand, most of the methods by which empirical equations have been obtained are liable to very grave objections, and lead frequently to doubt and perplexity. If, however, the engineer is satisfied to consider the velocity sought as that which, multiplied by the area of the transverse section, will give the discharge, a general equation may be found which will hold good for all measures without the necessity of changing the coefficients. Such a formula the author submitted to the Institution.

$$\text{I.}\quad V = C\sqrt{Sg}\left[R^{\frac{1}{2}} + \frac{0{\cdot}22}{m^{\frac{1}{2}}}(R - 0{\cdot}15\,m)\right]$$

V represents the mean velocity in seconds for all measures of length; C, a coefficient which varies with the nature of the bed; S, the sine of the angle of inclination of the surface; R, "the mean radius" or "mean hydraulic depth" (which is found by dividing the area of the channel by the length of the perimeter in contact with the fluid); g, the velocity acquired by a falling body in a second of time; and m, the height of the column of mercury which balances the atmospheric pressure.

For units of English feet and seconds, this formula becomes for channels in earth in good order—

$$\text{II.}\quad V = 62\,R^{\frac{1}{2}}\left(R^{\frac{1}{2}} + R\frac{R}{7} - 0{\cdot}05\right),$$

For metres-seconds, it takes the simple form—

$$\text{III.}\quad V = 34\,S^{\frac{1}{2}}\left(R^{\frac{1}{2}} + \frac{R}{4} - 0{\cdot}03\right).$$

In both cases a mean height of 30 English inches of the barometer is taken.

The following table gives examples calculated by the general formula. They have been selected from numerous experiments by different authorities, and were used by the author in founding it. The surface inclinations range from less than $\frac{1}{2}$ inch per mile to 1200 feet per mile; the velocity from 2 to 250 inches per second; and the channels from a pipe $\frac{1}{4}$ inch diameter to the Mississippi, where the river has a maximum depth of 101 feet.

No	Units.	R.	S.	Velocity.		C.
				Observed.	Calculated.	
1	E F.	36·4500	·00006745	1·804	1·819	11
2	,,	64·5200	·00004365	6·825	6·993	,,
3	F.I.	55·3470	·00016540	27·620	25·753	,,
4	,,	40·4280	·00011210	17·420	17·430	,,
5	S.F.	5·2000	·00029	3·470	3·450	12
6	,,	9·3000	·00037	5·620	5·663	,,
7	M.	0·0989	·10100	3·747	4·039	13
8	,,	0·1424	·10100	4·931	4·998	,,
9	,,	0·1767	·10100	5·694	5·670	,,
10	,,	0·2017	·10100	6·429	6·202	,,
11	,,	0·0090	·00025	0·051	0·051	15
12	,,	0·0608	·04105	2·073	2·229	,,
13	,,	0·0608	·13981	3·833	4·115	,,
14	,,	0·0205	·00232	0·358	0·364	20
15	,,	0·1250	·00045	0·449	0·476	,,
16	E.F.	1·0709	·00018929	1·844	1·856	21
17	,,	2·3297	·00018886	2·937	2·945	,,
18	M.	0·1116	·00150	0·921	0·935	23
19	E.F.	0·0035	·00336	0·165	0·166	29
20	,,	0·01045	·2309	4·439	4·356	31

Units.—Time = Second. Length: E.F. = English feet; F.I. = French inches, *ancien systeme*; S.F. = Swiss feet; M. = metres.

Referring to the examples; it may be mentioned that No. 1 is the Parana River; No. 2, the Mississippi; No. 3, the Hayne; No. 4, the Canal du Jard; No. 5, the Linth Canal; Nos. 7 to 10, the Burgundy Canal; Nos. 11 to 13, old cast-iron pipe; Nos. 14 and 15, new cast-iron pipe; Nos. 16 and 17, brick-lined conduit at Sudbury; No. 18, pure cement conduit; No. 19, new lead conduit; No. 20, glass conduit. With regard to the table, the coefficients in the column C have been derived from numerous experiments made independently by different observers; and although, for so far, the formula can be only considered as one more added to the numerous empirical ones already published, the close agreement between the observed and calculated velocities, its application to all units of length, and the very extended range of the data in the examples cited, must to a certain extent give confidence in its use as a general formula. Though such agreement is not an absolute proof of the correctness of such formulæ, the great difficulty, if not impossibility, of establishing a strictly mathematical theory of the motion of water in canals, excuses, if it does not justify, their adoption.

The United Gas Improvement Company, according to a financial contemporary, is about to be transferred to an English Syndicate. The Company's capital is £1,000,000.

The Sanitary Institute.—The ninth course of lectures and demonstrations for sanitary officers, specially adapted for candidates preparing for the Institute's examination for inspectors of nuisances, has been arranged for. They will be delivered on Tuesday and Friday evenings, at eight o'clock, at the Parkes Museum, Margaret Street, W.; commencing on the 18th inst. Among the subjects to be dealt with will be "Water Supply: Drinking Water, and the Pollution of Water," by Dr. Louis Parkes; "Drainage and Construction," by Professor H. Robinson, M. Inst. C.E.; "Sanitary Appliances," by Professor W. H. Corfield, M.A., M.D.; and "Sanitary Laws," by Mr. A. Wynter Blyth, Barrister-at-Law, M.R.C.S.

The Liberty and Property Defence League have issued a report as to their work during the past session. The object of the League, it may be remembered, is to maintain freedom of contract, uphold proprietory rights, and resist socialistic legislation; and all Bills which had a tendency to contravene these principles were carefully watched. In a great many instances the labours of the League were attended with success. In the case of the Metropolis Water Bill, which was to deprive the Metropolitan Water Companies of their right to cut off the water supply in the event of the fittings being defective, the action of the League was directed against the attempt to deprive the Companies of powers granted to them in their original charters, without any evidence of their having been abused. Nearly 5000 requests for opposition were sent out by the League; but the Bill was withdrawn before the second reading.

REGISTER OF PATENTS.

Distributing Mechanism for Gas Motors.—Boult, A. J.; communicated from Emil Capitaine, of Berlin. No. 121; Jan. 3, 1889. [8d.]

This invention of improvements in distributing mechanism for gas motors has for its object to enable the toothed wheel ordinarily employed to be replaced by a crank or an eccentric. In order to operate the valves at each alternate revolution, only an arm is pivotted to the eccentric rod; and this alternately comes in contact with, and misses the valve-rod. This reciprocating movement of the pivotted arm is produced automatically in the following manner:—To the arm pivotted to the eccentric rod is pivotted a plate having a spring bearing on the arm, and holding the plate in the position it happens to be in. The arm is provided with two side arms adapted to come in contact with two stops fastened preferably to the cylinder, and a forward projecting arm provided with a pin adapted to press one or the other of two springs aside; the springs being preferably fixed to the cylinder. The strength of the springs is not great enough to overcome that of the spring bearing on the arm pivotted to the eccentric rod; so that when one of the side arms comes into contact with one of the stops fixed to the cylinder, the pivotted arm will be turned on its pivot, and its end will not come in contact with the end of the valve-rod, but pass it. One of the springs fixed to the cylinder is pushed aside during this movement by the pin fixed to the forward projecting arm of the plate pivotted to the arm pivotted to the eccentric rod; and during the backward movement of the eccentric rod, the bent spring returns the pivotted arm into its normal position.

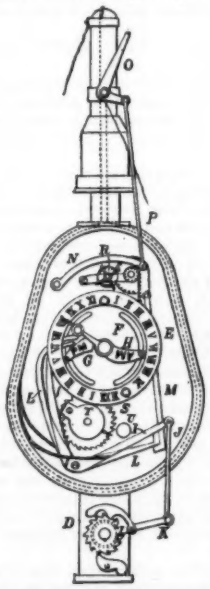
Automatically Lighting Gas.—Duke, J. F., of Camberwell, Briggs, A. B., of Withington, and Macpherson, R., of Fallowfield, Lancs. No. 466; Jan. 10, 1889. [6d.]

This invention has for its object the lighting of gas by directing the stream of it against a layer of spongy platinum or platinum black—substances which rapidly occlude gases—thus creating heat which renders the occluding substance incandescent and lights the jet. The occluding substance is placed in a receptacle in such a position outside the burner as that the gas issuing from the burner impinges upon it.

The best mode of fitting the spongy platinum to the receptacle is by intimately mixing it with asbestos in the proportion of one of platinum and three of asbestos. The asbestos must be thoroughly teased out, after which the platinum and it are mixed together, so that the asbestos retains as much of the platinum as is necessary for the purpose, as will be readily known by its colour. From the receptacle containing the platinum and asbestos, a fine platinum or iridium wire is led into contact with the gas as it issues from the burner; so that, by turning on the tap and allowing the issuing gas to blow upon the occluding material, the requisite incandescence of such occluding material is obtained; the wire serving to convey and intensify this incandescence until it is sufficiently aglow to ignite the gas.

Automatic Gas Lighting and Extinguishing Apparatus.—Bridewell, R. F., of San Francisco. No. 2269; Feb. 8, 1889. [8d.]

This apparatus—adapted for automatically lighting and extinguishing a street gas-lamp—is shown in the engraving in sectional elevation.



As shown, the casing has in its walls passages A for the gas; and the lower ends of these passages join the gas-supply pipe, and the upper ends the burner. The supply-pipe is controlled by a valve D, which is cylindrical in cross section, and is horizontally arranged in its seat transversely to the pipe. The cylinder is provided with diametrically arranged ports which, by the rotation of the valve, can be successively brought into alignment with the passage in the pipe, so as to open the gas communication and allow the gas to pass to the burner; the space between the ports serving to cut communication off. The projecting end of the valve D is provided with a ratchet-wheel actuated by a pawl, and held in position by a retaining pawl; both pawls being weighted or counterweighted as desired. Upon the face of the casing is a dial E; and within the centre of the dial is mounted, upon the hand arbor, a wheel F. Pivotted on this arbor are also the oppositely arranged cams G and H, which can be clamped and set in any required positions on the face of the wheel by set screws passing through the cams and into curved slots or grooves in the face of the wheel. Pivotted to the face of the casing is also a bell crank lever I, the vertical arm of which is in the paths of the cams G and H, so as to be operated thereby; and the horizontal arm of this lever is connected by a link J with a pivotted arm K, whereto an actuating pawl is attached. Pivotted also at the same point is another bell crank lever L, the vertical arm of which is also in the path of the cams G and H, though at a point higher up. It can therefore also be operated thereby after the lever I and the horizontal arm of this lever rests on a shoulder on the lower end of a link M, the upper end whereof is connected with a curved lever N, which is pivotted to the face of the casing. O is a lever pivotted on the burner, and carrying the sparking point by which the gas is lighted. The other end of this lever is connected by a link P with the curved lever N.

The action of the apparatus as hereinbefore described is as follows:—The clockwork mechanism is arranged to turn the hand through a complete revolution in 24 hours; and therefore the wheel F mounted on the hand arbor is also turned therewith in 24 hours. The cams G and H are so set on the wheel F, that their points indicate on the dial E the desired times. If (say) the cam G causes the gas to be lighted, and the cam H causes the gas to be extinguished, when the cam G in its rotation comes in contact with the vertical arm of the lever I, it forces it backwards, thus raising the horizontal arm of the lever I, which, through the link J and arm K, moves the pawl over one tooth of the ratchet wheel on the valve D. As soon as the cam G in its rotation releases the lever I, the spring depresses the horizontal arm of this lever, thereby (through the link J and arm K) bringing the pawl forwards and turning the valve D so that one of its ports is in line with the inlet passage in the inlet-pipe, thus opening communication for the gas to pass up to the burner. The cam G, while it is operating the lever I, also comes in contact with the vertical arm of the lever L, forcing it backwards, and raising the horizontal arm so as to release the links M and P and allow the spring of the sparking lever O to raise its horizontal arm and throw the sparking point backwards into position. In the illustration, the lever O is shown in its normal position, with its spring tending to throw the upper arm of the lever over to the left of the burner. This tendency is resisted by the lever L whose spring keeps its horizontal arm down on the shoulder of the link M. Now, when as the cam G lifts this arm of the lever L off the shoulder, the spring is permitted to throw the upper arm of the lever O over to the left of the burner, and to keep it in this position until the cam G in its rotation releases the lever L, and the spring depresses its horizontal arm down on the shoulder. In this way the links M and P throw the sparking lever O back to the position shown, so that its point moves across the burner and lights the gas. The movement of the sparking lever to the left of the burner is for the purpose of getting it into a position where the link M may engage the lever L when released by the cam G; and also to permit the lever and its adjuncts to be operated during the movement of the lever that controls the gas communication. The lever L is released by the cam G shortly after the lever I is liberated by the same cam; and this gives sufficient time for the gas to reach the burner before the sparking point moves across it. The apparatus remains in this position until the cam H comes round in its turn and operates the lever I in a similar manner. The valve D is thus so turned as to close the gas communication and cut off the supply of gas.

In places where the gas is not lighted when the moon is full or is just approaching or past it, the mechanism is rendered inoperative during the desired period as follows:—S is a gear-wheel driven by the clockwork mechanism and mounted on a stud, whereon also is loosely mounted a disc T having a projecting lug, which can come in contact with both the levers I and L. The disc T can be clamped and set in any required position on the face of the wheel S by a set screw, which passes through the disc or the lug and into a curved slot or groove in the face of the wheel. To facilitate the adjustment of the disc T, there is placed on the face of the casing a representation of the full moon U, and projecting from the periphery of the disc T is a pointer. The wheel S is so geared up as to make a complete revolution in 28 days (a lunar month); and the disc T is set on this wheel S in such wise that, when the pointer is turned towards the moon U, or nearly so, the lug forces both the levers I and L backwards out of the path of the cams G and H, so that they cannot be operated thereby, and retains them in such positions during the period in which the gas is not to be lighted, and then, by the rotation of this wheel, the lug releases the levers and allows them to regain their former positions and be operated by the cams as already described.

Gas Motor Engines.—Williams, H., of Stockport. No. 3820; March 5, 1889. [6d.]

This invention relates to gas-engines of the "Stockport" type, in which the cylinders are arranged tandem at opposite sides of the crank-shaft; the chief object of the improvements being to ensure the delivery of full charges of the explosive mixture from the compression or charging cylinders into the power cylinders.

Fig. 1 [next page] is a longitudinal vertical section of a double-acting "Stockport" gas-engine fitted with these improvements. Fig. 2 is a plan of it partly in section.

The two power cylinders are placed on opposite sides of the crank-shaft B, on which is mounted the driving-pulley and fly-wheel. The two power pistons have the ends of their respective connecting-rods fitted together to form a crosshead, through which the crank-pin passes. There is cast with the end of the connecting-rod, a projection carrying a stud E, which constitutes a crank-pin for a connecting-rod F, the other end of which is secured by a pin G to the connecting-rod H and the piston I of the compression or charging cylinder J. The connecting-rod of the other piston is screwed into the end of the connecting-rod H, and is secured by nuts, so as to permit the adjustment of the relative positions of the two pistons and also ensure their simultaneous movement. The engine is provided with the usual ports, passages, valves, and igniting arrangements, of the ordinary well-known construction.

The advantage obtained by driving the piston of the compression cylinder J from the separate and independent crank-pin E is that a

Fig. 1.

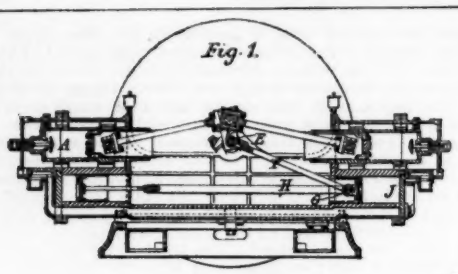
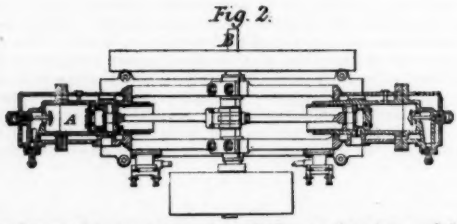


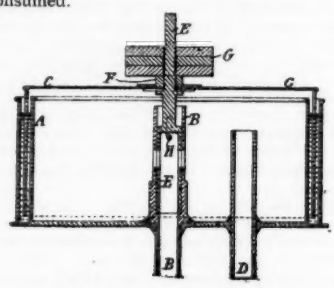
Fig. 2.



longer or later stroke is given to it, and also to the piston of the other compression cylinder, than that of their corresponding power pistons. Consequently after each power piston has completed its instroke, the compression piston below it will still continue to move inward for a short distance; and the effect of this continued movement is to drive a full charge of explosive mixture into the opposite power cylinder. During the time this compression piston is forcing its charge from the cylinder J into the power cylinder, the opposite compression cylinder will be drawing in a fresh charge of explosive mixture.

Regulating the Supply of Gas to Engines, &c.—Williams, H., of Stockport. No. 3821; March 5, 1889. [6d.]

These improvements consist chiefly in applying to the gas-supply pipe a valve arranged to be operated by the movement of the cover of the vessel so as to open the inlet more or less (or to close it completely), as necessary for the purpose of maintaining as nearly as possible a uniform supply of gas through the outlet irrespective of variations in the quantity consumed.



The illustration shows a hermetically sealed vessel with an inlet-pipe B, through which fluid under pressure is supplied. C is the rising and falling cover dipping into liquid in the annular space shown; and D is the outlet-pipe, through which fluid is conducted to the point where it is consumed. In the inlet-pipe is fitted the valve E, the stem of which is passed through the rising and falling cover C, and is secured to the latter by a nut F; care being taken to make a gas-tight joint. The stem of the valve is loaded with weights G to increase the pressure and regulate the rising of the cover; while to guide the valve, and prevent the cover from lifting too high, a pin H is fixed in the valve, the pin passing through a slot in the pipe B.

Holes (as shown) are made in the inlet-pipe, and corresponding holes in the valve E, so that when the parts are in the relative positions shown fluid under pressure can flow freely from the inlet-pipe B into the vessel, and away through the outlet-pipe D; but when through any decrease in the consumption of fluid, and consequent tendency to increased pressure in the vessel, the cover C is lifted, the valve E, rising with it, partially or wholly closes the inlet holes, and so regulates the supply.

Clearing Ascension-Pipes.—Parlby, W., of Hereford. No. 4168; March 9, 1889. [6d.]

The object of this invention is to provide a tool for use in clearing choked ascension-pipes that will not only make a hole but clear away the deposit and leave the pipe with a full bore, so as to prevent the necessity for manipulating with it again for a considerable time.

Fig. 1 is an elevation of the proposed tool; and fig. 2 a plan of it. Fig. 3 shows in side elevation a modification in form of one of the claws; fig. 4 being a front view of it. Fig. 5 is another modified form in side elevation; and fig. 6 is a front elevation. Fig. 7 is a further modification of the claw in side elevation.

The instrument is made with a head A, still something like that of an augur, but with two or more claws B projecting from the lower part of the head as shown; the whole being welded together and forming a shank C. The claws are so curved that, when the hole in the obstruction is made, the claws follow; and as the instrument is turned about in the pipe, and then pulled out, the obstructing substance is removed by the claws, which are so spread as to extend to near the full internal diameter of the pipe. The head, together with the claws (preferably made of steel), is attached by the shank C to a rod or bar, either curved or cranked to suit the particular circumstances. Instead of the claws being of the form shown in figs. 1 and 2, some of them may have their upper parts wedge-shaped, with the thin or cutting edge at the

Fig. 1. Fig. 3. Fig. 4

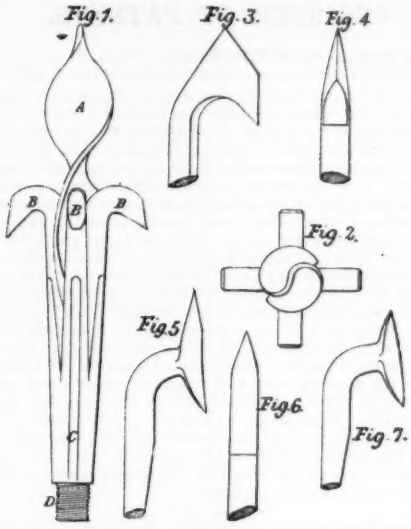


Fig. 2.

Fig. 5

Fig. 6

Fig. 7.

top, as shown in figs. 3 and 4, or the claws may be made as in figs. 5, 6, and 7.

By the application of this instrument, says the patentee, much labour and annoyance are saved, and "pipe-jumping" is generally rendered unnecessary.

Manufacture of Producer Gas.—Morse, M. A., of Chicago, U.S.A. No. 15,426; Oct. 1, 1889. [8d.]

This invention relates to the manufacture of producer gas suitable for use as fuel or for motive power; the object of the invention being to provide for the converting of the tarry vapours generated from bituminous coal or slack into fixed gas by conducting them through a body of highly-heated fuel. To this end the bodies of bituminous coal or slack of such coal are reduced to coke; at the same time distilling the hydrocarbon vapours and gas therefrom at a low temperature and by a smothered combustion. The coke is then discharged into the fuel chambers below, where it is maintained at a high temperature; utilizing the hot coke for superheating and fixing the producer gas and combined tarry vapours passing off from the fresher bodies of coal or slack in the chambers above. It is also proposed to mingle a hydrocarbon vapour or liquid (preferably crude petroleum) with the hot producer gas and vapours distilled from the fresh bodies of coal, and pass the resulting carburetted mixture through bodies of highly-heated coke for converting all into a fixed gas. In this way it is claimed that there is generated a producer gas of high calorific value, which is practically dry and free from condensable matter; so that it may be distributed through mains and stored in a holder without danger of condensation.

Gas-Engines.—Lindermann, O., of Queen Street, Cheapside, E.C. No. 16,391; Oct. 17, 1889. [8d.]

This invention relates to improved mechanism for obtaining intermittent action of the valves and other parts of a gas-engine, whereby the rotary motion of the main-shaft is directly employed to give a reciprocatory motion to the valves or other parts at every two or more revolutions of the main-shaft.

The reciprocatory motion is obtained by a connecting-rod attached to an eccentric or crank-pin on the main-shaft, and to obtain the intermittent action of the valve, instead of connecting the rod directly to the spindle or lever of the valve, there is employed between the two a moveable disc having on its edge alternate projections and depressions, which is rotated by a pin and star-wheel in such a way that, during one revolution of the main-shaft, one of the projections on the disc comes into contact with the spindle or lever of the valve, and permits of motion being communicated to the latter; while during the following revolutions, one of the depressions on the disc being brought opposite the spindle or lever of the valve, no contact is obtained, and therefore no motion is communicated to the valve. The valve or other part desired to be actuated may thus be moved during one revolution, and left standing still during other revolutions of the main-shaft; the periodical movement of the valve being made according to the arrangement of the projections on the disc. The patentee makes use of the elliptical motion of a connecting-rod attached to a crank-pin or eccentric on the main-shaft, both to give the required reciprocating motion to the valve, and at the same time to rotate the disc by means of the pin and star-wheel already mentioned; so that the reciprocatory motion of the connecting-rod is communicated to the valve only at certain definite periods.

The mechanism may be so arranged that the disc and star-wheel are attached to the engine-framing, and are moved round a certain distance by a pin on the connecting-rod engaging the teeth of the star-wheel at each revolution; or the pin may be fixed to the engine framing, and the disc and star-wheel attached to, and moved with, the connecting-rod in an elliptical line, as already described.

APPLICATIONS FOR LETTERS PATENT.

1383.—Johnson, R., "Improvements in rotary apparatus for blowing, exhausting, or pumping air, water, and other gases or liquids." Jan. 27.

1412.—Bergman, T., "Improvements in incandescent gas-burners." Jan. 27.

1493.—Rossney, W. C., and Cutler, W. G., "Improvements in and relating to regulators for gas-engines." Jan. 28.

1653.—Kennedy, G., "Improvements in and connected with saturators for sulphate of ammonia plant." Jan. 29.

1747.—Herbert, W., "Timepiece gas-regulator, to turn on and lower gaslight at any time required." Feb. 1.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

Prepayment Gas-Meters.

SIR,—With reference to the letter of Mr. S. Glover, of the St. Helens Gas-Works, in your last issue, I think I ought to state that I am now making a very simple, reliable, and inexpensive coin-prepayment gas-meter. It is generally admitted that this is the best plan yet proposed to meet the requirements of small consumers. Any system of sending round a collector to get the cash and to set the meter to give the required quantity of gas does not meet the difficulty. The defect of the deposit system still remains, with an additional disadvantage to the consumer of being liable to have the gas cut off, and have to wait in darkness for the collector's visit. This system was tried 30 years ago, and the meters were made in Birmingham.

Birmingham, Feb. 7, 1890. R. W. BROWNHILL.

The Strike of Gas Stokers at Mossley.

SIR,—I am obliged to Mr. R. Merrell, the Manager of the Mossley Gas-Works, for his information in reply to my letter on the above subject. First of all Mr. Merrell says his works are only "small" ones, though they produce 76 million cubic feet of gas per annum. What will he say to works making 10 millions only? I cannot see in his letter the reason for changing from six-hour to four-hour charging. If he had divided his retorts into (say) 12 charges in the 24 hours, at intervals of two hours, and divided the men as well, each lot would have been out of the other's way. It might have been strange at first, and a drawback; but it would have come right in time. Every gas manager knows very well what over-charging means. If he does not, he ought to; and he should have good firemen.

By Mr. Merrell's statement, I understand him to say he used 7 cwt. of coal for three retorts in six-hour charging; which, I take it, means 14 cwt. in twelve hours. But in the eight-hour shift, he puts 5 cwt. of coal in three retorts, to work off in four hours. By this he gained 1 cwt. of coal in twelve hours, which I should not think worth doing. I should expect to get bad heats in that way, and do no good either. My men work twelve-hour shifts—each man drawing and charging 28 retorts in the time, as well as attending to two fires; and I get more than 10,000 cubic feet of gas per ton of ordinary Newcastle coal, and that not very dry. My gas is of 17-candle power 2¼ miles from the works. Mr. Merrell puts a gross weight of 6¾ cwt. on his barrows; and therefore it cannot be a matter for surprise if there was a "pitiable struggle" between the man and the barrow. My barrows weigh only ¾ cwt., and have 4 cwt. so disposed that the men have to lift only 1 cwt. at the handles; yet they are quite efficient, and strong for retort-house work. I should be glad to send Mr. Merrell a drawing of them, if he would care to have one.

Feb. 7, 1890. A COUNTRY MANAGER.

SIR,—In reply to Mr. Buckle's question concerning the eight-hour shifts at Montrose—how I was able to work them without more men—it is easily explained. Six stokers made the gas last winter, working in two gangs of three men each. This winter they worked in three gangs of two men each, and, of course, eight-hour shifts. Nothing else was changed. Had I altered the duration of the charge from four hours (our usual time) to three, the probabilities are that, like our Mossley friends, I should have got 8800 cubic feet of gas instead of 11,200 feet per ton, and have had to return to twelve-hour shifts. As it is, the stokers are quite pleased, and say it is the easiest winter's work they have had.

Mr. Buckle says; "The men being fresher does not put more gas *into* the coals." I agree with him there; but the fact remains that they took more *out*.

The coal used here is all cannel; and the gas is of 28-candle power.

Gas-Works, Montrose, Feb. 8, 1890, THOS. D. HALL, Manager.

A Question as to the Action of Water-Meters.

SIR,—Can you or any of your correspondents inform me whether it is possible, or at all probable, that during a given period a Siemens water-meter may go wrong and register incorrectly, then rectify itself so that thereafter, on being tested, it is found correct? This appears to me to be a question of considerable importance, as very few of the general public who may be served by water-meters are acquainted with the reading of these instruments.

I have used the water supplied by our Corporation in my business premises for three half years and four months, and during this time have been charged according to a Siemens patent water-meter. The water is supplied through a ½-inch pipe. It can only be used for the particular purpose of feeding engine boilers, and any waste would be immediately observed by the boiler overflowing. At the end of the first half year, the meter indicated 90,000 gallons as having passed through it; the second half year, during which the boiler was not so often filled, it registered 664,000 gallons; and at the end of the third half year 220,000 gallons. During this half year I know that considerably more water was used than in either of the preceding periods. The meter has registered for the last four months 60,000 gallons, which is equal to 90,000 gallons for the six months; this being the equivalent half year to that in which 664,000 gallons were registered, and as much water has been used as then. I objected to pay the account for the half year in which this enormous quantity of water was registered, and the meter was taken out and tested; so that for the last ten months I have been charged by another meter of the same make. Some time afterwards I was officially informed that the meter had been found correct, and that if I did not pay, legal proceedings would be taken to compel me. The supply-pipe has been tested, but no leakage discovered; and I have also tested the rate at which I can be supplied, by running the pipe at full pressure. By this means I find that it takes 250 minutes to run 1000 gallons; so that 664,000 gallons would require 115½ days of 24 hours, or 230½ working days of 12 hours, for this ½-inch pipe to pass the quantity of water charged, running at full pressure. The water is only used during the working day of 12 hours, and then only occasionally and never at full pressure; so that it is almost impossible that the water registered has been used. This leads one to conclude that the meter has gone wrong; and if it was found correct when tested, it must have righted itself in some way. Hence my present query.

I shall feel grateful if either you or any correspondent can explain the apparent inconsistency.

Feb. 7, 1890. WATER-METER.

Water Supply by Meter for Domestic Purposes.

SIR,—"Constant Supply," in his letter in the last number of the JOURNAL, does not tell us how much profit his borough gains by selling water. That is the most important question affecting private companies. Will consumers pay sufficient per 1000 gallons to give the shareholders a reasonable profit? It is hardly fair to compare corporations with private companies. "High Pressure" alludes to the temptation to reduce the price for municipa reasons. There is no doubt that where meters have been adopted for checking waste, the object has been accomplished; but in a great proportion of the cases we read about, there was practically no attempt to find waste before the meter system was tried.

Feb. 7, 1890. J. G.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

Tuesday, Feb. 4.

(*Before Justices* CAVE *and* SMITH.)

Ward v. Folkestone Water-Works Company—The Stopcock Question.

This was a special case stated by the Magistrates of Folkestone, who on Oct. 9 last year, sitting in Petty Sessions, dismissed an information by the appellant seeking to recover a penalty from the respondents for refusing to furnish a supply of water to his dwelling-house in Folkestone. The question at issue (to which several references have been made in our columns) was the right of the Folkestone Water Company to insist on payment by consumers of the expense of putting in screw-down valves and guard-boxes on the supply-pipes, where a constant high-pressure service is maintained. The appellant, who was the owner and occupier of the premises in question, had been for some time a customer of the Company; and having been served with a notice by them to put in a screw-down valve, declined to do so—giving as his reason that he was prohibited by the regulations of the Corporation from breaking up the streets. The respondents thereupon gave him notice that unless he did the work the water would be cut off; and this was consequently done. Thereupon the appellant sued the Company for a penalty under section 63 of the Water-Works Clauses Act, 1847; and the Magistrates dismissed the information.

Mr. DUKE appeared for the appellant; Mr. DENMAN (with whom was Mr. MURPHY, Q.C.) for the respondents.

Mr. DUKE submitted that the only appliance the Company could compel the consumer to provide was for preventing waste of water upon his own premises. The appellant had no right to break up the street in order to do the work in question; while the respondents had this power by their Act of 1888. The Local Acts ought not to be so construed as to compel the respondent to commit a trespass.

Justice CAVE: Did the Company offer to move for a *mandamus* to the Corporation?

Mr. DUKE: No; they cut off the supply, and left the appellant to fight the Corporation. The Corporation threatened him with an injunction.

Mr. DENMAN argued that the Local Act of 1858 gave the Company power to require the performance by the appellant of the work alluded to.

Justice CAVE: The screw-down valve is not included there; it only becomes necessary when your clients provide a constant supply.

Mr. DENMAN: The Company may cut off the supply for non-compliance with their proper requirements, and the Justices find that the screw-down valve is necessary to prevent waste.

Justice SMITH: Necessary to protect the Company; not necessary to regulate the supply.

Mr. DENMAN: Under the General Act of 1847 there is, it is submitted, power in the consumer to do this work.

Justice CAVE: The Company clearly have power by the Act of 1888. Where is there any Act which authorizes the Company to tax the consumer for such a purpose?

Mr. DENMAN: The General Act of 1847, if its several provisions are considered, it is contended gives that power.

Justice CAVE: You say the power taken by the Company in 1888 was unnecessary?

Mr. DENMAN: Yes; it is a redundant power.

Justice CAVE: Yet power is not taken to compel the consumer to pay or do the work himself.

At the close of the arguments, their Lordships gave judgment as follows:—

Justice CAVE: To my mind, this is an extremely clear case. The Water Company claim the right to compel a consumer of water to put down a screw-down valve in the street into the pipe which connects his house with their main. They must show by very clear and unmistakeable language that they are entitled to call upon the consumer to incur an expenditure of this kind. It is said first that they are entitled to require it under section 14 of their Act of 1858. Section 13 entitles the Company to prescribe the size, nature, and strength of the pipes, cocks, cisterns, and other apparatus to be altered or fixed; but this

alone does not enable them to compel the consumer to put down any pipe or apparatus of any kind. All it says is that if the consumer puts down pipes or apparatus, the Company may prescribe what kind he should use. Section 14 is more to the purpose, because it prescribes what is to be done by the consumer: "All persons supplied with water by the Company should provide proper ball or stop cocks, or other necessary apparatus [that is, there may be something else, other than a ball or stop cock] of approved construction, for regulating such supply." The object of the ball or stop cock, as everyone knows, is to regulate the supply—to let the water in when it is wanted, and exclude it when it is not wanted. That is the object of the section; and under it it seems to me perfectly clear that the Company had no authority at all to compel the consumer to put down this particular kind of screw-down valve. It may be added, that at the time the Act of 1858 was passed, the Company were compellable only to give an intermittent supply, not a constant supply of water; and the case finds that this particular screw-down valve becomes necessary. I think we must take it, therefore, that it only becomes necessary when the Company are bound to give a constant supply. It is said, secondly, that this power is contained in the Water-Works Clauses Act, under section 47, and so on. I pass over section 44, because it is perfectly obvious that, whatever may be the works which the owner of a house under the annual value of £10 may be compelled to do *d fortiori* the owner of a more important house—a house of a greater value—would likewise be obliged to do; and what the owner of a larger house cannot be compelled to do, the owner of a small tenement of less than £10 value cannot be made to do. Section 47 says: "The owner or reputed owner of any house where any communication-pipes or other works should have been laid down by the undertakers, may at any time pay off the amount due, . . . and all rent due in respect thereof, and thereupon such pipes and works thus become the property of such owner, and all further rent in respect thereof shall cease." Then section 48 goes on to say that any owner or occupier of any dwelling-house within the limits of the Special Act who should wish to have water from the undertakers brought into his premises, and who should have paid or tendered the portion of rates due, may open the ground before the pipes of the undertaker, having first obtained the consent of the owners of the ground, and lay any leaden or other pipes from such premises to communicate with the pipes of the undertakers; such pipes to be of a strength and material to be approved of by the undertakers, or, in case of dispute, to be settled by two Justices. When he has done this, then by section 53, when he has laid the communication pipes and paid or tendered the water-rate, he shall be entitled to demand a sufficient supply of water. That is not a case in which they can compel him to lay down pipes; it is a question of his laying down pipes, and then being entitled to call on the Company to supply water. In this particular instance this had been done long before; and there was an actual supply of water going on into the house in question at the time the Company made this demand, and sought to enforce it by cutting off the supply. In point of fact, as far as we know, no one ever seems to have considered the necessity of these screw-down valves, or that they were ever put down at all, or deemed to be necessary, until by the Act of 1888 the Company were compelled to furnish a constant supply of water. Then it became necessary to consider what protection they would require, and what new powers should be conferred in order to enable them to give a constant supply with the least possible inconvenience and damage to themselves. This being so, section 5 provides that the Company may require to be fixed outside of the premises, and at or near the point at which the communication-pipe for the conveyance into any premises of the water supplied by the Company enters the premises, and attached to the pipe, a sound and suitable stop-valve of the screw-down kind; and then it prescribes the dimensions, and says it should be provided with a guard-box. That is perfectly legitimate and proper. The screw-down valve and guard-box have become necessary because there is going to be a constant supply of water; and therefore there is inserted the provision enabling the Company to put them in—a necessary provision wherever the pipes are the property of the consumer, and one without which the Company would not have been able to interfere with pipes already laid down, and insert these screw-down valves. If, under these circumstances, it had been intended by the Legislature that the screw-down valve should be put in by the consumer, or that the consumer should be compelled to pay for it, one would have expected that there would have been a proviso or an additional section giving the Company power to compel the consumer to do this, or providing that the Company might do the work and call upon the consumer to pay for it; or, in case the consumer was to do it, giving him power to break up the streets for the purpose. No power whatever is given to the consumer to break up the streets. The words of the section apply to the Company, and to the Company only; and not one word is said, nor is there a suggestion to be found anywhere in the Act, that the consumer is to pay for having this done, though the section was inserted by the Company for their benefit and in their favour. Under these circumstances, it appears to me perfectly clear that the Magistrates came to a wrong conclusion; that the Company have no power to require the consumer to put down these screw-down valves nor to compel him to pay for them when they are put down. Consequently, the decision of the Magistrates was wrong, and they ought to have convicted. The case must go back to them with a statement of our opinion to this effect.

Justice SMITH delivered judgment to the same purport. He pointed out that the first Act which had been brought to the attention of the Court, whereby compulsion was allowed to be exercised by the Company on the consumer, only dealt with ball-cocks or other apparatus on the premises of the consumer, for the purpose of preventing the water running to waste. The Act of 1888—thirty years afterwards—was evidently passed with the object of giving protection to the Company when they were put under the obligation to maintain a constant supply of water. They then needed more protection than a ball-cock would give them, and therefore the section in question was inserted. He saw nothing in the section compelling the consumer himself to put in the stop-valve, or to pay for it if put in by the Company. He thought, therefore, that in this case the Magistrates had erred, and that the Company, having cut off the water, were liable to a penalty.

The appeal was accordingly allowed, with costs.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of this Company was held at the Chief Offices, Horseferry Road, Westminster, last Friday—Colonel W. T. MAKINS, M.P., in the chair.

The SECRETARY and GENERAL MANAGER (Mr. J. Orwell Phillips) having read the notice convening the meeting, the report of the Directors, with those of the Chief Officials of the Company, and the accounts for the half year ending Dec. 31 last (the principal portions of which were given in the JOURNAL last week) were taken as read.

The GOVERNOR, in moving the adoption of the report and accounts, said that during the past half year they had expended on capital account £47,000, about half of which was expended on ordinary extensions of mains and works, and the other half for stoves and meters. A considerable time had passed since they had had to ask for additional capital; but now the requirements of the Company had overtaken the capital, which would require to be increased, during the present year, by £300,000. The Directors had it in their power to raise the money in various ways; but looking at the state of the money market, and at the price of their stock, probably the best way of obtaining it would be to issue the balance shown in No. 2 statement as remaining to be borrowed, of £192,020, as 6 per cent. debenture stock; and they would probably offer this amount to the public next July. Another point with respect to the capital which was of a very satisfactory nature, was that the capital employed per ton of coal carbonized exhibited a steady reduction. In 1888, it was £6 os. 4d., and in 1889, it was £5 14s.—a reduction of 6s. 4d. per ton. In issuing and raising the further £300,000 mentioned, he hoped—and in fact he felt confident—that this amount per ton of coal carbonized would not be sensibly increased. Turning to the revenue account, he said that it showed various increases, compared with the corresponding period of 1888, amounting altogether to £47,133, of which £17,081 was attributable to coke, £18,769 to tar and tar products, and £9500 to ammoniacal liquor and sulphate. On the other hand, they had lost in income on the sale of gas £36,610, owing to the reduction in price. They had had to pay £13,700 more for coal, £42,500 more for wages, and £5800 more for purification. Wear and tear showed an increase of £18,000; distribution, £5600; and on stove and meter repairs, they had expended £12,000 more. These amounts, with an increase in parliamentary charges of £3870 (which had been incurred mainly in watching and getting protection in the Orders of the Electric Light Companies), brought up the debit, with a few other small items against the half year, to £105,000. The amount of profit for the six months had been £288,828, or 10½ per cent. on the ordinary capital. The public and some of the shareholders had no doubt been rather alarmed at seeing that they were only earning 10½ per cent., while they were declaring a dividend at the rate of 13¾ per cent. In January last year, they reduced the price of gas by 3d. per 1000 cubic feet, which represented a diminution in their income of £200,000. If they had let the price remain as it was, the probable result of the year's figures would have been that, instead of making 10½ per cent., they would have made 16½ or 17 per cent., paid the full dividend, and carried over perhaps £500,000. These bloated balances, as they were called, however, were of no good; and when the Directors could see their way to increase the dividend, they reduced the price of gas. The effect of the reduction mentioned had been very satisfactory; for, whereas they had stood to lose by it £200,000, they had, as a matter of fact, lost only £96,000. The finances of the year had been something of this sort: They brought forward £304,000; and the reduction of 3d. was estimated to cost them £200,000. So that at the end of the year, if nothing had taken place to vary the working of the previous year, they would now be carrying forward £104,000. The increase of gas sold, however, had produced them £103,000. The most satisfactory feature of the half-year's working had been the remarkably substantial increase in the quantity of gas sold, which had amounted to no less than 5¾ per cent. A great deal of this was due—the greater portion probably—to the increased use of gas for fuel. There was no doubt that the use of gas for this purpose was being very largely developed; and it was also increasing by their ordinary lighting business, which had been very satisfactory indeed. In the half year ended December, 1888, the net increase in the stoves was 905; in the six months to December, 1889, the same item was 5581.—that was to say nearly sixfold. The number of stoves sold in the half year in 1888 was 211; whereas in the past half year it was 2614. The number of new services laid had increased from 3600 to 4200; and the lights, from 40,000 to 45,000. The net increase of the meters and lighting was very satisfactory; but the fuel business appeared to be growing, as Mr. Gladstone once said, by "leaps and bounds." Having given figures in proof of this, he stated incidentally that the number of stoves sold by the Company up to June was 2068; whereas the number sold up to Dec. 31 last was 4722. The gas-stoves on hire had shown a similar increase. The number on hire at June, 1889, was 10,417; and at the end of last December, it was 15,998. The increase of gas sold had shown, on the whole, a steady improvement; but it had been very varying since 1885. As he himself had said before, and as the Deputy-Governor had just reminded him, the amount of increase in the consumption depended very much on the temperature; and as the proprietors were aware, they had passed through a remarkably mild winter. This, of course, must tell upon the present rate of increase; and so far in the current year, they had had no increase at all, owing to the fact that there was a decrease of nearly 6 per cent. for the month of January. The number of cubic feet of gas sold per ton last year as compared with 1888, was not so satisfactory as usual. In 1888, the figures were 9727 feet; in 1889, 9653 feet—or a reduction of about 75 cubic feet. He feared that they could only come to the conclusion that this had arisen from two causes—one, that they had not had quite such good coal, the high price of which had rather demoralized their deliveries; and in the second place, they had not had quite so good working as usual. The disturbed state of the labour market had without doubt resulted in their getting a smaller production than usual; but they hoped, now that things were settling

down, they would revert to their customary good working. The leakage was just about the same. The maximum daily delivery of gas reached the highest point on Dec. 30, 1889, when it attained 10 per cent. in excess of any former experience; the quantity turned out on that day being 115 million cubic feet. The next highest amount was on Jan. 7 last year, when the quantity was 105 million. They could have distributed a great deal more gas on the foggy day he had mentioned had they had the necessary appliances and plant. This was what made it necessary for them to face at once a capital outlay, and to increase their means of producing the gas; because if they had a maximum out-turn of 115 million cubic feet in December, 1889, it was possible that the quantity might reach 130 millions in 1890, if there were a similar black foggy day. Therefore they were proposing at once to use the capital to which he had referred in fitting up a retort-house at Kensal Green, providing purifiers and plant for working it, and also putting up a gasholder and tank at that station and Beckton. Next year they would commence a new retort-house at Beckton; but they must make preparation for it this year. It would also be necessary next year to extend their pier at Beckton so as to enable them to avoid demurrage and delay. The new retort-house would be fitted up in the newest way. As he had just said, all kinds of inventions were being brought forward for cheapening the production of gas; and a very important one had come to the front within the last nine months with respect to the setting of the retorts. Hitherto they had practically always been placed horizontal, and charged with a scoop and discharged with a rake. It was now proposed—and the proposition had assumed a practical shape—that they should be fixed at an incline of 32°—that was to say fixed at an angle; and then they would be charged automatically from above, and discharged by gravitation. The result of this would probably be an enormous saving in the cost of labour. It was proposed to fit up the new house at Kensal Green with these inclined retorts, to which the stokers had facetiously given the name of "Ally Sloper's" (laughter). They had had a serious loss from the incapacity of Mr. Harris, their late Distribution Superintendent, who had been retired, after a long service, at a suitable pension. His duties had been taken over by Mr. Foulger, who had been appointed Chief Inspector; and he (the Governor) believed that Mr. Foulger would be of great value to the Company. The increased cost of production, as he had said before, had arisen mainly from the increased cost of coal, iron, and materials generally; and the very large addition to the cost of labour. With regard to coal, they had re-arranged their contracts; and a large portion of them they had been able to re-arrange on terms which, though showing a considerable increase, were very satisfactory, looking at the price of coal. He hoped that the "boom" in coal would not be of a prolonged character. An increased demand for coal always produced an increased output; and efforts were being made in various parts of the country—more particularly he thought in the midland counties—to work some of the thinner seams of coal. Though these were not so good and valuable to them for gas making, yet by the use of enriching processes in connection with water gas, he thought they would be able in the future to use a commoner and cheaper kind of coal, and so reduce the cost of gas, and at the same time improve the illuminating power of it. At present the price of coal would tell heavily against them in the current year. They started with a balance of £198,000; but he must prepare them for the fact that a good deal of this sum, if not all of it, might possibly be required to be used in the course of the year. They had still a reserve of £500,000, and a considerable insurance fund; and they had always the power, if necessary, of increasing the price of gas. He hoped it might not be essential; but if they had to pay so much for coal and labour, it might be absolutely necessary to raise the price, as had been done at Leeds and other places, where they had not a reserve to tide them over a period like the present. He did not think they would have to raise the price; but if they did charge 3d. per 1000 cubic feet more, probably they would get £200,000 more revenue. They would, however, have to drop their dividend from 13¾ to 13 per cent., which was not a bad return. If it should be necessary for a year or two to increase the price of gas, he believed that this would be the utmost limit of the increase which would be required, because the various improvements that were being introduced would probably tide them over. At the same time it was just as well the consumers should know that if the Company were to pay so much more for labour and coal, it could not all come out of the dividend. Referring to the labour question, he said that he had a duty to discharge which he did with peculiar satisfaction, and that was to congratulate Mr. Livesey and his colleagues on the termination of the great and successful struggle which they had maintained in support of their freedom of contract, and the moral, legal, and natural right of every man to sell his labour on such terms as he thought best for himself. (Applause.) Disguise it as they might, this was the issue of the fight that had been carried on; and he was very glad that the action of the Chairman and Directors of the South Metropolitan Company had been vindicated by such a result as they had seen. He had been asked, otherwise he would not refer to the matter, why their Company had not taken similar steps—why they had not put forward a bonus scheme, and, so to speak, worked alongside of the South Metropolitan Company. His answer was, in the first place, that they were not consulted in the matter at all; but he did not say that there was any reason why they should be. Even, however, had they been asked or consulted in the matter, he did not think they would have adopted it exactly in the shape in which it had been put forward by the South Metropolitan Company. He was not condemning the system that Company had adopted, but it appeared to him that it was a scheme which involved a *quasi*-partnership between the men and the shareholders; and a *quasi*-partnership, at any rate logically, to his mind, involved a right of partnership in the management of the Company. He did not think that dual partnership would be desirable; but if the men required it, they would be ready to consider a bonus scheme. He would prefer it, however, to take this shape: That they should give a bonus of a fixed amount for monthly agreements—such a sum for one month, or two months, or three months—and that the amount should be totally distinct and apart from any question of profit, and belong to the man conditionally only on his satisfactorily performing his duties. This would be a scheme which, he thought, would get rid of a most undesirable state of things, under which the men in the depth of winter were able to give a week's notice to leave. He was quite convinced, however, that, if the men did not see it in this light, it would be useless to try and thrust it down their throats. He had hopes (and evidence, in fact) that there was a desire on the part of some of their men to enter into such an arrangement, which he thought a fair and honourable one, and beneficial to both parties. The increased cost of labour to which he had referred had arisen from the eight-hour shift. The probable increase in wages expenditure for 1890, consequent on the reduction in the number of hours of work, and the increased rate of pay, would amount to a total of £130,000—equal to 1¾d. per 1000 cubic feet of gas. These increases in the cost of labour, however, had a tendency to correct themselves, because they brought into operation the mechanical appliances to which he just alluded. They would be obliged, not in a spirit of hostility to the men, but in the natural course of their business, to look out for means of reducing the expense of producing their gas. They had not interfered with the organizations of their men, and they had no intention to do so, as long as the Unions kept within the law, and did not exercise illegal pressure either in picketing, boycotting, or intimidation. The men had a perfect right to combine; but what they had no right to do was to compel other people to combine, or to make it difficult for those who did not belong to their Union to make arrangements with their employers to sell their labour on such terms as they thought fit. He was very glad to say that they had practically got rid of Sunday labour. With regard to the subject of water gas, Mr. Trewby, their Engineer, went to America in the past autumn and spent two or three months there in a careful examination of the methods of manufacturing water gas.* His report was too long to read; but it had convinced the Directors that, though they must not expect to use water gas in lieu of coal gas, they could use it with very great advantage to supplement their supply when a sudden demand arose. Water gas could be made very rapidly; and it was of a very high illuminating power when properly enriched. It would also save them from having to use such a large quantity of cannel coal, for which they paid a very high price; and in their case a very small percentage of addition to the amount of cannel used considerably increased the cost of production of their gas. They had commenced experiments on a large scale at Silvertown, Beckton, and Bromley, and he hoped at the next meeting, or this time next year, to give the shareholders a satisfactory account of the results of the experiments. The only unsatisfactory point to which he had to refer was the little friction which had arisen between themselves and the South Metropolitan Company, which he would be very glad to see put an end to. Having reminded the shareholders of the original dispute between the two Companies, he said that the House of Lords had decided in favour of their Company—reversing the two previous adverse judgments of the Courts below. What they had to do now was to find out the amount of profit they had lost by the South Metropolitan Company supplying gas to the Nine Elms station. They had made out an account and had tendered it to the South Metropolitan Company, who, however, demurred to it. They made out that it was about £7600, over and above £4300, which they had paid in law costs, but which they could not recover. At present the two Companies could not agree as to the amounts. He was very sorry that this question should have arisen, particularly at a time like this when they all felt they were so greatly indebted to Mr. Livesey. After all, however, there was no question of feeling in it. It was simply a matter of strict legal claim; but if they gave up the claim, they might render themselves liable to having a bill filed in the Court of Chancery by some parties against the Directors for making away with profits which belonged to them. There was neither occasion nor wish that the matter should form the basis of any ill-feeling between the Companies. As to the question of the testing of gas, he believed the Board of Trade intended to bring forward a Bill which would enable them and the public authorities to agree on a better standard for ascertaining the illuminating power. As to electric lighting, the companies supplying it were steadily increasing their business; but that did not affect the business of gas companies very much.

The Deputy-Governor (Mr. H. C. Ward) seconded the motion.

A short discussion ensued, which was taken part in by Messrs. Jackson, Grover, Carbert, and General Bevill. Satisfaction was expressed at the position and prospects of the Company; and Mr. Livesey and the Directors of the South Metropolitan Company were warmly commended for the action which they took in connection with their men, and were congratulated on the outcome of the struggle. A suggestion was also made that the Company should not press for the amount due from the South Metropolitan Company.

The Governor, in reply to questions, said that water gas had been used at Chicago for seven years; and there had not been a single accident. He would be glad when coal could be manipulated entirely by machinery from the ship to the mouth of the retort.

The motion was unanimously adopted.

Resolutions were then passed declaring the dividend recommended, and re-electing the retiring Directors (Mr. John Aird, M.P., and the Hon. H. Noel), and the Auditors (Messrs. Chisholm and Mr. Farnan).

Mr. Rokeby Price then proposed a vote of thanks to the Governor.

Mr. George Livesey (who was warmly received, and acknowledged the hearty reception the Shareholders had given him) seconded the motion; saying that he desired to do this to show that, as far as they were personally concerned, there was nothing but friendly feeling on both sides. In proof of this, perhaps, he might read a letter which he had that morning received from Mr. Phillips:—"My dear Livesey,—However much we may differ and agree to differ on some points, I am at least able to offer you my very warm congratulations on the announcement I see in this morning's newspapers. I trust that the 'termination of the strike,' and 'termination of your difficulties' may be convertible terms." He believed, if the two Companies worked amicably together, it would be mutually advantageous; and he believed if they had been on more cordial terms some months ago, the labour difficulty would never have assumed the proportions it had.

The Governor, in returning thanks, heartily reciprocated the kindness

* A communication by Mr. Trewby on the subject of water gas as manufactured for illuminating purposes in America appeared in the Journal for the 7th ult. (p. 17).

expressed by Mr. Livesey. If Mr. Price would accept the post of Arbitrator, and the Court would give the Directors an indemnity, he was sure that no difficulty would arise in connection with the amount in dispute between the two Companies.

The proceedings then terminated.

PROVINCIAL GAS AND WATER COMPANIES.

The season has arrived for the Directors of Provincial Gas and Water Companies to meet the shareholders and report upon the results of the working of their concerns during the past six or twelve months as the case may be. As we have stated on previous occasions, it is impossible to deal at length with the numerous statements and reports of meetings which reach us; and therefore, as in former half years, we shall give summaries of them under the above heading.

Gas Companies.

The report of the Directors of the Calverley and Horsforth District Gas Company for the past half year shows that the receipts from all sources amounted to £3849, and the disbursements to £2561; leaving a balance of £1288 to be carried to dividend account. The capital account has been increased by £1396 during the half year.

The half-yearly meeting of the Cambridge University and Town Gaslight Company was held last Thursday week, when the Directors submitted a report (which was adopted) in which they recommended a dividend at the rate of 10 per cent. per annum on the original consolidated stock, and of 7 per cent. on the consolidated stocks of 1880, 1882, and 1885, and on the new £10 shares. The Directors referred, with feelings of deep regret, to the loss which the Company had sustained by the death of their venerable Chairman (the Rev. Robert Phelps, D.D.); and they recorded their sense of the valuable services he rendered to the Company, and their grateful recognition of the courtesy, ability, and devotion to the interests of the undertaking which characterized his relations with it for a long period of 46 years. Lieut.-Col. Caldwell, M.A., was selected to fill the vacancy on the Board.

The half-yearly meeting of the Grantham Gas Company was held last Tuesday, when the Directors reported that their hopes respecting an increased consumption of gas had been realized, and the threatened advance in the price had consequently been avoided. In the interests of the Company, they intended holding an exhibition of gas-stoves and apparatus for cooking, warming, &c., as soon as the necessary arrangements could be made. On the recommendation of the Board, the usual dividends of 5 per cent. on the old shares and 3½ per cent. on the new shares for the half year ending Dec. 31 last were declared.

At the meeting of the Malton Gas Company last Wednesday, the Manager (Mr. H. Tobey) reported that the sale of gas for private consumption in the half year ending Dec. 31 last was 15,211,400 cubic feet, which, at 3s. and 2s. 6d. per 1000 feet, realized a revenue of £2278. The lighting of the public lamps brought in an additional £298; making the total receipts from the sale of gas £2576. The quantity of gas supplied was an increase over the corresponding half of 1888 of no less than 1,256,800 cubic feet. The Manager attributed this in a great measure to the more general use by the public of gas-stoves and fires for heating purposes—a branch of the business which, with the sale of gas-fittings and the carrying out of asphalting works, he has pushed with great energy since the incorporation of the Company in 1880. Four years ago the price of gas was reduced to 3s. per 1000 feet; and the public, with the high price that coals have now obtained, are fully appreciating the reduction. The total use of gas for private consumption in the four winter half years since that time has been 57,582,000 cubic feet, or an average of 14,395,550 cubic feet per six months. The balance of profit and loss at the close of last year amounted to £1659 19s. 10d.; and the Directors recommended a dividend of 6 per cent. for the half year—making 11 per cent. for the year. This was agreed to. A vote of thanks was accorded to the Directors for their successful management of the undertaking.

The annual meeting of the Newcastle and Gateshead Gas Company will be held to-morrow, when the Directors will have the pleasure of reporting to the proprietors a substantial increase in the business during the past year. The revenue was £180,368, and the expenditure £115,282; leaving a balance of £65,086 as the net profit for the year, which they recommend to be disposed of as follows:—To the payment of interest on debentures and loans, £4742; to intermediate dividend of 4⅜ per cent., less income-tax, paid in August last, on £550,000 stock, £24,801; to the payment of the second half-year's dividend of 4⅜ per cent., less income-tax, £24,801; balance, £10,740—total, £65,036. The balance from last year was £43,299, and there is now a sum to be carried forward to the credit of next year's accounts of £54,040. The increase in the revenue over the previous year was £10,816. On the other hand, the expenditure was £11,441 more than in the former year. During the twelve months, 13⅜ miles of pipes have been laid in extension and renewals; 1422 new branches have been laid; and 1236 old branches renewed. There have been erected 208 ordinary street lamps; 13 30-feet per hour lamps fitted up for private consumers; and 101 cooking-stoves have been fixed on hire—making the total 869. The extensions to the retort-house and other buildings at Elswick, which last year's report stated had been commenced, are almost completed, and part is now in operation. The Directors announce that they have conceded the eight-hour shift in the retort-houses; and that wages will thus be materially increased during the current year. A considerable advance has also taken place in the cost of coals; but it is expected this will be met to some extent by increased prices for the residual products. The Directors regret to report the death of one of their colleagues, Mr. B. Plummer, which took place on June 12 last.

A satisfactory increase, both in the sale of gas and the receipts for residuals, is exhibited in the accounts of the Scarborough Gas Company for the past half year; and a profit of £6742 is shown in the revenue account. The net revenue is £6736; and out of this sum, after providing for the dividend on the 5 per cent. preference stock, the Directors recommend, in their report, the payment of the maximum dividends upon all other stocks of the Company, all less income-tax. The payment of these dividends will absorb £5141, leaving a balance of £1594 to the credit of next half year. The effect of the increased price of coal after the expiration of existing contracts in June next, together with the additional cost of labour consequent upon the adoption of shorter hours and increased wages to retort-house men and the general advance in the price of materials used by the Company, may necessitate, the Directors observe, a proportionate advance in the price of gas; but with the balance they are able to carry forward, they defer taking any immediate action in the matter.

The Directors of the Westhoughton Gas Company have just issued their report and statement of accounts for the half year ending Dec. 31 last. During this period the capital account was increased by £320, principally spent in the erection of a new exhauster, which is working satisfactorily. The profit on the half-year's working was £539 14s. 4d., out of which a dividend of 4½ per cent. is recommended.

The business of the York United Gaslight Company made steady progress during the past half year; the gas consumption having increased over the corresponding period of the previous year by 3½ per cent. The Directors' report, which was presented at the meeting of shareholders last Thursday, showed that the balance of revenue carried to profit and loss amounted to £7951. Of this sum £365 had been paid for the half-year's interest upon money borrowed on mortgage, leaving £7585 available for division. The Directors recommended that the usual dividend be declared of 5s. per share on the old shares and 4s. 3d. per share, or 5 per cent. per annum, upon the new shares, free of income-tax, the surplus profit to be carried forward to the next accounts being £885. In moving the adoption of the report, the Chairman (Mr J. F. Taylor) mentioned that, although there had been several advances in the price of gas, the Directors did not propose to increase theirs; and they hoped they would not have to do so in the future. Their desire had been rather to lower the price; but they were prevented from doing this at present owing to the high price of coal. He did not fear the electric light, when they could supply gas at the rate of 2s. 3d. per 1000 cubic feet. Mr. W. W. Wilberforce seconded the motion, which was agreed to. The dividends recommended were also declared.

Water Companies.

According to the Chairman (Mr. J. G. Thompson) the past half year has been the most favourable one the Grantham Water Company have ever experienced—due chiefly to the increased consumption of water for trade purposes. The accounts show a revenue balance of £3457; and of this sum £1750 is to be applied to the payment of a dividend of 5 per cent. for the six months, leaving £1707 to be carried forward.

The accounts of the Cambridge Water Company for the past half year, presented at the meeting of shareholders last Friday week, show a slight improvement in the business. The number of new supplies laid on in the six months was 323, the increased rental derivable from which is £263. After paying a dividend on the consolidated stock at the rate of 10 per cent. per annum, and on the amount paid on allotment of the new shares at the rate of 7 per cent., there is a balance of £2886 to be carried forward.

The Directors of the South Staffordshire Water-Works Company have resolved to recommend, at the forthcoming meeting of the proprietors, the declaration of a dividend on the ordinary stock at the rate of 5½ per cent. per annum, less income-tax. After appropriating £2000 to the depreciation fund, a balance of £1596 will remain to be carried forward.

The net income of the Warrington Water-Works Company for the past half year will permit the Directors to recommend, at the meeting of shareholders to-morrow week, the declaration of the following dividends:—7 per cent. upon the £30,000 ordinary 7 per cent. shares, with a further ½ per cent. to make up the dividends for the year 1889 to the maximum statutory rate; 7½ per cent. upon the £15,000 ordinary 7½ per cent. shares, with a further 1 per cent., to make up the dividend for the year to the maximum statutory rate; and 9½ per cent. upon the £30,000 ordinary 10 per cent. shares.

The annual report of the Weardale and Shildon District Water Company discloses a healthy state of affairs. The net revenue reached £23,028, including £1947 brought forward. The dividend paid to the shareholders averages 4 per cent. per annum. Owing to improved trade, the Company earned last year £2551 more than in 1888, and pay 4 per cent. for the year, against 3¾ per cent., besides carrying forward a large undivided profit.

In the report which the Directors of the York Water-Works Company presented at the meeting of the shareholders last Thursday, they stated that the Nidd scheme of the Bradford Corporation, if carried out, would injuriously affect the York water supply. Consequently it was imperative upon them, in the interests of the shareholders and consumers, to vigorously oppose the Bill; and they felt confident this decision would commend itself to the shareholders. The Chairman (Mr. J. F. Taylor), in moving the adoption of the report, stated that, when the Board examined the Bradford scheme, it was seen that not only did Bradford propose to come out of their natural watershed and to invade the water resources of the Upper Nidd, which naturally and geographically belonged to the inhabitants of Nidderdale and York, and to abstract the whole of the beautiful spring water from that area for the use of Bradford, but the compensation water they proposed to provide for the use of Knaresborough and York consisted solely of the discoloured flood waters, which were not good enough for Bradford, and waters from an inferior drainage area. The Directors considered it was due to the shareholders and the citizens of York that the matter should receive careful consideration. The report was adopted; and dividends were subsequently declared for the half year at the rates of 5 per cent. per annum on the preference shares, of 9 per cent. on the ordinary shares, and of £6 6s. per cent. on the new shares.

The Electric Light in Trinity College, Dublin.—The authorities of Trinity College, Dublin, have just introduced the electric light in their School of Anatomy. The hall has been fitted with 78 incandescent lamps, each of 25-candle power. The dynamo and accumulator are fixed in a building in the College grounds. The motive power by which the dynamo is driven consists of an "Otto" gas-engine of 7-horse power nominal.

GAS WORKMEN AND THE LABOUR QUESTION.

Collapse of the Agitation in South London.

The agitation commenced about two months ago among the gas stokers and workmen in the service of the South Metropolitan Gas Company, which, as our readers are aware, culminated in the abandonment of their work by about 2000 of the Company's hands, came to an end last Wednesday, through the intervention of the London Trades Council. The events of this important labour movement have been so fully recorded in our columns from week to week that recapitulation of them is unnecessary. It may, however, be mentioned that the dispute arose early in December last on the profit-sharing scheme put forward by Mr. G. Livesey with the concurrence of the other Directors, the acceptance of which was considered by the men to involve a sacrifice of liberty of action which they were not prepared to make; and they demanded its withdrawal, on pain of the Company being deprived of their services. The Directors declined to comply with this demand; and the men gave up their situations, which were immediately filled by others. The result of the intervention of the Trades Council in the dispute was the submission to Mr. Livesey last Tuesday of the following agreement:—

We, the undersigned members of the Gas Stokers' Union, the Coal Porters' Union, and the Seamen's and Firemen's Union, authorized by a delegate meeting of the London Trades Societies held at the Assembly Hall, Mile End, E., on Saturday, Jan. 25, 1890, hereby urgently request the London Trades Council to negotiate with the Directors of the South Metropolitan Gas Company for a settlement of our existing dispute upon the following conditions:—

(1) That except where mutually agreed to the contrary, the Company revert to the eight-hour system, as in operation previous to the strike, instead of the longer hours now worked.

(2) That in the event of any vacancies arising, the Directors will give their former workmen the opportunity of returning to their employment in preference to strangers.

Upon the condition that the foregoing terms are agreed to by the Company, we severally and jointly agree that the strike be officially and formally declared at an end, and we pledge ourselves to recommend all the men now on strike to accept these terms as a settlement of the dispute.

The foregoing document bore the signatures of Messrs. Mark Hutchins, W. Thorne, and A. Mouan, on behalf of the Gas Stokers' Union, and of Messrs. G. Shelley and H. King, on that of the Coal Porters' Union. It was countersigned by Mr. G. Shipton, Secretary of the London Trades Council, and by Messrs. C. J. Drummond and W. A. Coote, members of the Council. The terms offered were accepted by Mr. Livesey on the part of the Company, and his signature, as Chairman, appended. The agreement was brought before a mass meeting of the men held on Wednesday at the Hatcham Liberal and Radical Club, and was ratified by a unanimous vote. This brought the dispute officially to a close. In the evening a communication was addressed to Mr. Livesey by the Strike Committee, asking him to consent to take on the married men with families among his old hands first of all; and to this proposal he at once agreed. It was decided to circulate the agreement among the men on the following day. The men claim that they are going back perfectly unfettered by the bonus agreement, and that the removal of this obnoxious obligation is highly satisfactory to them. It has been arranged that the Strike Committee shall continue to meet at their quarters, as help will be needed by the men until they are able to obtain work.

The following letter, dated the 5th inst., from Mr. G. Livesey, appeared in the London papers on Thursday morning:—

Yesterday morning, just two months after the stokers gave in their notices in consequence of our refusal to abolish the profit-sharing arrangement, the accompanying document [the agreement above referred to], which has to-day been "unanimously agreed to by the men," was brought to me from the London Trades Council signed by the officers of the Gas Stokers' and the Coal Porters' Unions, and countersigned by officials of the first-named body. As there was nothing to which objection could be taken, I added my name on behalf of the Company; and this has to-day been approved by the Board.

In regard to the first point, for reasons into which I need not enter, the new men, except at one of our largest works, started on the old two-shift system; and it was our intention to revert to the eight-hour shifts as soon as practicable. At several of our stations the men voluntarily, and by an almost unanimous vote, elected to work permanently on the two-shift system, which gives them longer intervals of rest; the pay being increased in proportion to the work. At all the remaining stations the eight-hour shifts have either been resumed or will be at the end of this week.

The second point, relating to the return of the men to work, is almost identical with the statement at the close of my letter to the Rev. Andrew Mearns of the 13th of December last, the day after the old hands went out.* I am sorry to say that vacancies will be very few in number, because, through the lengthening of the days, the make of gas is being rapidly reduced; and those who have the first claim on us are the new men, who have been promised that none of them shall be discharged to make room for the old stokers. A request has been made that the older servants should be the first to be re-engaged, which has been willingly assented to by the Directors.

I cannot close this letter without expressing, on behalf of the Board and all connected with the Company, their thanks to the Press for the fair and impartial manner in which they have placed the facts of the case before the public.

Referring to the settlement of the dispute, *The Times* last Thursday said:

The gas stokers have at last formally recognized the fact, which has been long patent to everyone but themselves, that they have been completely beaten in their struggle with the South Metropolitan Gas Company. A document "formally and officially" declaring the strike at an end, and signed by representatives of the Gas Stokers' Union, the Coal Porters' Union, and the London Trades Council, was presented to Mr. Livesey on Tuesday morning for his assent to two conditions annexed to this magnanimous recognition of an accomplished fact. He cannot have felt the smallest reluctance to append his signature to the document, which was yesterday laid before a mass meeting of the strikers and by them unanimously ratified. As the two conditions in question do not affect the situation in the slightest degree, they can only have been inserted by way of disguising from the men the unconditional surrender to which their Union Executives have been driven. It is stipulated, first, that, except where mutually agreed to the contrary, the Gas Company shall revert to the eight-hour system as in operation previous to the strike, instead of the longer hours now worked; and, secondly, that in the event of any vacancies arising, the Directors will give their former workmen the opportunity of returning to their employment in preference to strangers. Mr. Livesey's letter explains the exact bearing of these two conditions. For reasons connected with the management of the Company's business, the nature of which will be readily conjectured by business men, the new hands, taken on after the strike, started, except at one of the largest works, upon the old two-shift system, which was abandoned in June last, in favour of the three-shift, or eight-hour, system. At several of the Company's stations, the men have voluntarily and almost unanimously elected to adhere to the two-shift system; but where that is not the case, the Company are reverting as rapidly as possible to the eight-hour system. Thus the first of the Union conditions is nugatory—amounting to nothing more than forcing an open door. As to the second condition, it is nothing but what Mr. Livesey declared to be the policy and intention of the Company as long ago as Dec. 13 last. He has always been willing to give the preference to old hands upon the occurrence of vacancies; and among the old hands he readily agrees to give the preference to the oldest, who will usually be the ones with the biggest families. It will be seen, therefore, that there is nothing at all in the two "conditions" formulated by the Unions. They simply embody the actual and voluntarily adopted practice of the Directors. It is reported that the men profess to believe themselves at liberty to return to the gas-works, when vacancies occur, unfettered by the bonus scheme. They assume, in other words, that they will not only have the preference over strangers, but that they will be taken back upon their own terms, and not upon the Company's. There is nothing whatever, either in the document they have signed, or in the practice of the Company, or in the promises made by Mr. Livesey at an earlier date, which can lend the least appearance of plausibility to such a contention. We do not know whether the Union leaders intend to found upon a quibbling construction of the phrase "the eight-hour system as in operation before the strike." If so, the men will save themselves disappointment by clearly understanding that the eight-hour shifts have no connection whatever with the bonus scheme. Men taken on to fill up vacancies will have to conform to the Company's conditions of service; and the preference promised to old hands will disappear if they make any difficulty about accepting these conditions. The strikers would also do well not to build too much upon the occurrence of vacancies. Mr. Livesey points out that the lengthening days lead to a reduction in the demand for gas; and, in the ordinary course of things, a steady reduction of the staff will go on for some months to come. That, of course, will be followed in due time by an increase; but when the days begin to shorten, the Company will have two classes of "old hands" to consider. On Dec. 19 Mr. Livesey issued notices to the men who had stood by the Company and the new men who came to its help at a critical moment. He promised very distinctly that "those men who leave the Company in the spring and summer will have the privilege of returning in the fall of the year for the full employment during the winter;" and also that "not one of the new men either at present or in future will be discharged to make room for any of the old stokers who have gone out on strike." It is as well to make the situation plain. The Company is under obligations, not only to new men to whom it can give permanent engagements, but also to new men who came to its assistance for a short term. When it requires to enlarge its staff for winter work, it is bound to give the first chance to new men dismissed in the summer for no fault of theirs, but simply because they are not required. After them, though still before total strangers, come the men who threw up their work at the most difficult and anxious period of the whole year. It would be unjust to dismiss this question without paying a tribute to the ability, firmness, and resource displayed by Mr. Livesey throughout the struggle. With a less able and resolute Chairman, the South Metropolitan Gas Company and the public might have fared very badly at the hands of the Unions. Although he was primarily fighting the battle of the shareholders, Mr. Livesey was also defending the interests of employers in general and of society at large. His failure in a difficult task would not only have involved the most serious inconvenience and danger to a large section of the Metropolis, but would have exposed the whole of it to similar perils, and would have increased indefinitely the arrogance of the irresponsible groups of agitators who wield the powers of the Unions.

On the same day the *Standard* contained the following comments on the subject:—

After attempting for two months to carry on a hopeless and disastrous struggle into which they should never have entered, the Gas Stokers' and Coal Porters' Unions have at last "officially and formally" admitted their defeat in the struggle with the South Metropolitan Gas Company. As will be seen from Mr. Livesey's letter and the accompanying document, drawn up by the strike leaders, the latter have simply accepted terms which they might have had from the first. The importance of this collapse scarcely needs pointing out. The story of the final negotiations is very simple. At the request of the stokers and coal porters, who, misled by interested and reckless advisers, were induced to make a daring attempt to throw half London in darkness because the profit-sharing scheme was not withdrawn, three members of the London Trades Council entered into negotiations with Mr. Livesey. Though the Chairman did his best to meet the wishes of those who thus addressed him, and, with a courtesy and consideration for the men's feelings which do him the greatest credit, took care to inflict no unnecessary humiliation upon the vanquished, it was practically impossible for him to make any real concessions. He undertakes that "except where mutually agreed to the contrary," there shall be a return to the eight-hour system in operation previous to the strike, but since discontinued; and that, in the event of vacancies arising, "the Directors will give their former workmen the opportunity of returning to their employment in preference to strangers." In consideration of these terms (which, it may be well to repeat, have been offered to the men from the very beginning), the Committee announce that the strike is to be "officially and formally declared at an end," and pledge themselves "to recommend all the men now on strike to accept these terms as a settlement of the dispute." That this so-called arrangement only registers the utter breakdown of the men's efforts to crush the Company at all risks, cannot be concealed by the form in which it is drawn up. But, though it is perfectly right that Mr. Livesey, as one of the combatants, should do nothing, now the victory is his, which could be in any way represented as wanting in generosity, or as displaying any shadow of a vindictive spirit, it is necessary for those who have maintained an impartial attitude throughout the struggle to speak out as to the conduct of the Strike Committee. That to-day there are many families in South London wanting bread, and many once comfortable homes ruined and broken up, is due solely to the rashness and want of reason and moderation with which the leaders acted. In spite of the fact that the gas stokers had received immense voluntary concessions from the Company,

* The statement was to the effect that the Directors did not cherish any unkindly feeling towards their late workmen, and would be glad, if vacancies arose, to give their old servants an opportunity of returning to their employment.—Ed. J. G. L.

and though they confessedly had no grievances in regard either to wages or hours of work, they deliberately attempted to prevent their employers and a large portion of their fellow-workmen from entering into a mutually beneficial agreement of a legal and perfectly reasonable kind. The responsibility incurred by the Committee, from whatever point of view we regard it, was very heavy. In one way, however, their failure may yet prove useful to the community. It may prevent the working classes for some time to come from trusting too implicitly those self-constituted guides who profess to have a right to regulate the relations between capital and labour.

The *Star* remarked that, although the stokers had obtained "two minor, though not important concessions," it would be useless to disguise the fact that they had sustained a substantial defeat—they had fought the battle of Trades Unionism and been beaten. This was attributable to three causes—the inability of the stokers to stop the "blacklegs;" the want of reserve funds; and the absence of a carefully arranged and previously concerted plan of campaign. The *Star* deeply regretted the result, for they considered the men, though wrong in tactics, were most indefeasibly right in their main contention.

MR. MICHAEL HENRY AND THE BECKTON COAL PORTERS.

In our editorial columns last week, we commented upon the recent action of Mr. Michael Henry, Secretary of the Coal Porters' Union, in regard to the porters in the service of The Gaslight and Coke Company. It will be remembered that these men have joined the Gas Workers' Union, instead of enrolling themselves as members of the other body. This appears to have caused some dissatisfaction to Mr. Henry, who, accompanied by a deputation from his Union, waited upon the Directors of The Gaslight and Coke Company, at their chief offices, on Dec. 30 last, and endeavoured to induce them to bring pressure to bear upon the men with the object of forcing them into his ranks. The result of the interview was that the Directors refused to move in the matter; being determined to leave the men free to choose which Union they would join. When Mr. Henry's action became known, the men passed a resolution protesting against it, and repudiating his right to interfere with their affairs, especially as they were satisfied with the agreement they had come to with their employers. As some question has lately been raised in regard to what took place at the interview, a verbatim report of the remarks on both sides has been published in the *Essex Times;* and we reproduce it below. It should be mentioned that the Directors of the Company present were the Governor (Colonel Makins, M.P.), Mr. H. C. Ward, Mr. John Aird, M.P., Mr. U. J. Burke, Mr. S. C. Clarke, and the Hon. H. Noel; the Secretary and General Manager (Mr. J. Orwell Phillips) being in attendance. The deputation (consisting of Mr. Henry, Mr. Shelley, Mr. Brill, and two others) having been called into the Board-room, the following conversation took place:—

The GOVERNOR: The Secretary and General Manager received your communication; and as it happened that we were to meet on other business to-day, we thought it would be a good opportunity to receive you, and hear what you have to say on behalf of those whom you represent. And may I, in the first place, ask who it is you do represent? Are they men in the employ of this Company?

Mr. HENRY: We have a good many members who are employed by the Company.

The GOVERNOR: In what stations?

Mr. HENRY: It would be hard to say. I believe at all, with the exception of one important station—Beckton. Our position in the matter is this: We have protested from time to time to the Gas Stokers' Executive against any attempt whatever that might be made to extend the strike to this Company; but, in spite of our protests, there have gone forth intimations that it is more than likely the strike will be extended to the Company. In spite of our protestations, although we are in entire disagreement with anything that might be done in that direction, intimations have gone forth from the President of the Gas Stokers' Union, that the strike would be extended to this Company. Those intimations, which no doubt you have seen, have been sent out without our concurrence, as I telegraphed to you. We have no quarrel with your Company, and do not want to have any; but we are bound by our compact with the Gas Stokers' Union that, if they come out, we should not supply coal to you. Now, here is the difficulty: We do not wish to break our compact with them, but we do not intend to be dragged over hill and dale into strikes which we do not want. We did not want this strike in the South Metropolitan Company. The Executive sent the men out without consulting us; and after they have sent the men out, they expect us to help the men out of the hole. We do not want to waste our time in useless strikes; but they seem to think that they would like to extend the strike to this Company if possible. The point which I wish to put before you is this: We can control our own members, but we cannot control the whole of the coal porters in your employment; and that is the difficulty which you have to meet. The coal porters of Beckton are considerably under the gas stokers' influence; and they are federated with the Gas Stokers' Union instead of being in our Union. Now, the Gas Stokers' Union, if they turned out after sending in their notices to you, could call the coal porters at Beckton out without consulting us at all, which would mean that at all the other stations our coal porters would come out in the same way, and we should have a strike on our hands that we do not want. Seeing the difficulty that you are in, we want to prevent this if possible. At the Mansion House, I proposed that agreements should be made between the men and the Company, which should give either you or us the option to terminate our engagements. That was to extend to every Company, and not only to the South Metropolitan alone. The only way out of the difficulty enabling us to keep an agreement with the gas stokers, and at the same time to protect you, would be this—that, as far as you could, you should issue instructions to your coal porters at Beckton and elsewhere to join their own Union. We have a meeting of our Executive to-morrow, and we could put before them the point as to having your coal porters members of our Union; that they should be under monthly agreements; and that all the monthly agreements should be signed upon the same day, so that if the gas stokers wanted to strike, they could not lay down their tools before five weeks' hence, when calmer counsels might prevail with them.

The GOVERNOR: What do you want us to do? Would you kindly repeat it, as I do not follow you?

Mr. HENRY: Your position is one of danger at the present time, because at your principal place—Beckton—the coal porters are members of the Gas Stokers' Union. The Gas Stokers' Union may at any moment call out their men. I heard that they did "down tools" at your works at Beckton during the last week.

The SECRETARY: I have not heard of it.

Mr. HENRY: I do not know whether or not it is the case; but while you have the coal porters members of the Gas Stokers' Union, they are liable to be called out by that Union against our authority.

The GOVERNOR: You say they are not members of your Union?

Mr. HENRY: The men of Beckton are not members of our Union.

The GOVERNOR: What do you suggest that we should do?

Mr. HENRY: At any moment we could make the men join our Union, because, we being federated with the Firemen's Union, they could only work ships manned by members of our Union, using members of our Union to unload them. But we have let them take ships to Beckton and elsewhere, in order to prevent any question arising. We have let them break that part of our agreement, because we knew that at any time if we saw these men at Beckton they would join our Union with one or two exceptions. There are one or two men there who would not do so. There is a man called Wheeler, who is very much in favour of the Gas Stokers' Union, and very much against the Coal Porters' Union; and this man Wheeler is keeping these men in this particular Union, and preventing them being members of our Union.

The GOVERNOR: Are the Gas Stokers' Union and the Coal Porters Union affiliated.

Mr. HENRY: No; we have no control over them. We could make them join our Union by giving them warning that we should stop the ships going there; but if we stopped the ships going there, we should hurt you in the same way. The danger is that these men, if they do not join our Union, will be called out by the gas stokers if they call their men out. We desire to make that impossible.

Mr. WARD: Do I understand you to say that we should take steps to make our men join your Union?

Mr. HENRY: We can make them join our Union without trouble; but this is the point—that we would rather see the whole of the coal porters in your employ under those monthly agreements. The gas stokers are very erratic in their movements—the Executive does not know its own mind for two days together; and we do not see the policy of allowing that state of matters to remain. We fear we shall be saddled with a strike which we do not want.

The GOVERNOR: Do you mean that the coal porters, for whom you speak, are in favour of monthly agreements, and that the gas stokers, to whom the coal porters are affiliated, are not in favour of them?

Mr. HENRY: They would be in favour of them as regards your Company; but if our Union have an agreement with you, the gas stokers must do the same as our porters do.

The Hon. H. NOEL: Do you ask us to put pressure upon the gas stokers at Beckton?

Mr. HENRY: While they are under the control of the Gas Stokers' Union, we have an agreement with the gas stokers, and that agreement is that if they come out we would not let any men come in to take their places to carbonize. That would be a big matter with your Company, but a small matter with a small company; but it is not the kind of thing that we ought to have to do. We have no earthly quarrel with you; and the gas stokers have no quarrel with you.

The GOVERNOR: Then having no quarrel now, what would induce them to act as you suggest?

Mr. HENRY: Their President has made statements of various kinds; and the men in your employment have made many statements. At the present time, under the agreement they have with us, they could command that we should come out concurrently with them.

Mr. WARD: Having the command of the Executive Council, you could call them out?

Mr. HENRY: We could command them to come out; and we should be compelled, under the agreement with them, to take part in any strike which might take place, which we do not want to do. They could compel us, by being able to call out coal porters in their employ, to call out the others.

The GOVERNOR: Do I understand that your Executive have so tied their hands that they could be ordered to stop coal, or could be ordered to do anything else by another Union to which they do not belong?

Mr. HENRY: If you are federated with a Union, by your agreement you agree to do certain things; and if you agree to do certain things, you must carry them out, or the Union would go to pieces. If your members enter into a monthly engagement that in the case of any dispute their agreement should be terminable at the end of the month, then we should say, "Here you have entered into a certain engagement, and when that engagement is over, and the agreement expires, then we can deal with you."

The GOVERNOR: No doubt a monthly agreement would be a desirable thing for both parties.

Mr. HENRY: These monthly agreements, if they could be instituted at once, would enable us to do this: We should say, "Well, before we can do anything, the agreement must come to an end." We should say, "We have our agreement with you that if you come out, we should come out with you; but we have a monthly agreement with the Company which is a legal binding agreement, and whatever dispute you have, put it in black and white before the Company, and if you cannot agree we will come out with you.

Mr. WARD: Then what you say is that we should enter into a monthly agreement with the coal porters, if they would agree to it; but we could not force them to enter into it?

Mr. HENRY: If our Executive put the matter before them, and said they must enter into it, they would consent to do so.

Mr. AIRD: Would not the Gas Stokers' Union resent such an agreement?

Mr. HENRY: They could not resent it.

The GOVERNOR: They would say, "You have entered into one agreement with us, and now you enter into another with the Company, which renders our agreement void?

Mr. HENRY: Our Union has amongst its members the trimmers who load the vessels.

Mr. AIRD: Your suggestion would detach a certain number of coal porters from the Gas Stokers' Union?

Mr. HENRY: That is a matter which the gas stokers are agreeable to; they desire that these men should join our Union. We could arrange with these men at Beckton, with the exception of half-a-dozen.

The SECRETARY: How many men belonging to your Union are in Beckton now?

Mr. HENRY: I do not know. It was a branch of our Union at one time; but it did not pay over its funds to us, and we did not trouble about it.

Mr. WARD: The most we could do would be to give them the option of being engaged upon these terms; we could not force them?

Mr. HENRY: It would be a very easy arrangement. The coal porters themselves whom you employ are not at all desirous of having a strike.

The Hon. H. NOEL: Could a man belong to two Unions—your Union and the Gas Stokers' Union as well?

Mr. HENRY: Some of them do.

The Hon. H. NOEL: To whom do they owe their allegiance then?

Mr. HENRY: The coal porters pay to us.

The GOVERNOR: What is the proposition which you come to put before us?

Mr. HENRY: If you will allow me a few minutes with my colleagues, who have just come, we will put the matter officially from our Executive before you.

The GOVERNOR: Are these members of your Executive?

Mr. HENRY: Yes.

Mr. WARD: Are these gentlemen in our employ?

Mr. SHELLEY: We represent people from each station.

Mr. WARD: Are there any members of the Executive who are in our employ?

Mr. HENRY: All the seaborne coal branches have members belonging to us. I do not know whether they are employed by you.

Mr. AIRD: Do you know how many members belong to your Union?

Mr. HENRY: I do not know.

Mr. AIRD: Are they employed in all the stations, including Beckton?

Mr. HENRY: Yes.

The deputation then withdrew to consult. On returning,

Mr. HENRY said: Our Executive have decided upon making some suggestions, which they will now do. They are merely suggestions, and have nothing to do with other matters. They think that, with the view of preventing anything like a strike, or, at all events, making it less likely to occur, it would be desirable that, as there are a good many stations belonging to you where the men are members of our Union, they should all become members. Take the men at Nine Elms and the men at Fulham, they are members of our Union; and in case of a strike our men could be called out, and they would be liable to be called out, and would have to come out, if the other men came out, without conference with us. Therefore we think it advisable that, for the purpose of averting a strike, or at all events of making it less possible, either now or at any future time, you should recommend the men at Beckton and elsewhere to join our Union. If you were to do so, we would advise our members of the fact, and would lay it before the Executive meeting to-morrow. We should advise our members that in case of any dispute, a month's notice should be given and taken upon either side.

The GOVERNOR: Are those your two propositions?

Mr. HENRY: They are not propositions, they are two suggestions.

The GOVERNOR: Will you repeat them in order to make them clear. Your first suggestion is what?

Mr. HENRY: That it would be desirable, for the purpose of averting strikes taking place either now or at any other time, that you should recommend your employees——

The GOVERNOR: You mean that the Company should recommend?

Mr. HENRY: Yes; that the Company should recommend the coal porters in their employ to become members of the Coal Porters' Union. We have a great many members in your employ at Nine Elms, Fulham, and elsewhere; and a great many of the coal porters could be called out now, in case of a strike, without our sanction, because they are members of the Gas Stokers' Union. It would therefore be better if the whole of the coal porters were under our Executive. Our Executive will consider the matter to-morrow; and this deputation will suggest to them the advisability of recommending our members to agree that in case of dispute a month's notice should be given or sent up on either side. That was the suggestion made by me at the Mansion House. We did not expect, in coming here to-day, to meet such a full Board; we expected to meet Mr. Phillips only, as he was at the Mansion House and heard our suggestions.

The GOVERNOR: I hope it is not disagreeable for you to meet the Board?

Mr. HENRY: Certainly not.

Mr. SHELLEY: Mr. Chairman, I should like to explain how this matter cropped up. There has been a good deal of outside foolish talk by some of the South Metropolitan gas stokers who are on strike, for which there is no ground whatever. They have been talking about the whole of the men being called out from this Company. We consider that after the way in which we were met at the Mansion House by Mr. Phillips, it would be very unbecoming on our part to allow such a thing to take place. It is in this way—that while a great number of the coal porters belong to the Gas Stokers' Union, if they should indiscriminately decide to call the stokers out, the coal porters belonging to their Union, over which we have no control, would have to come out, in consequence of being members of that Union. Hearing these foolish rumours, which, I am sure, there is no foundation for, as to there being a general strike, we thought we should like to put our views before you upon the matter. I may say that I have never heard such a thing mooted by our Executive. I think it would be advisable that all the coal porters should belong to our Union—the largest number of them doing so at the present time; and I feel confident that if this were the case, it would be possible for us to prevent a strike entirely. We are all opposed to it. I do not think there is ever any good got by striking. I think it is far better that a little persuasion should be used, and that if that persuasion is used, as well as argument, it would be possible to avert all strikes; and this would be far better than rushing to hasty conclusions.

The GOVERNOR: We are all with you upon that point.

Mr. SHELLEY: I think if we had a month on either side to settle any dispute that might arise, and notice to follow after that, if the matter was brought before our Executive and clearly explained to them it could be satisfactorily settled. I think myself that it is very wrong to jeopardize the lighting of London at a week's notice, or whenever the men feel disposed so to do, just because of some trifling upset. It is very wrong that they should "down tools" at a moment's notice. Such an evil as that ought to be guarded against upon both sides; but while the men are in two Unions, it cannot be prevented. I may say that we are all averse and strongly opposed to strikes, but we are powerless in the matter while we have no control over men belonging to the Gas Stokers' Union; and it is with the sole object of averting a strike that we have come here to-day. We detest strikes; we do not want anything of the kind. We want to work amicably together; and that is what we are endeavouring to bring about by our appearance here to-day

Mr. BRILL: Mr. Chairman, I may say that I have been on the Strike Committee all through; and I have never heard a word mentioned about calling out the gas stokers of The Gaslight and Coke Company.

The GOVERNOR: When you say you are on the Strike Committee, what Committee do you refer to?

Mr. BRILL: I refer to the Strike Committee of the gas stokers of the South Metropolitan Company. I have been there every day; and I never heard such a thing mentioned as calling out The Gaslight and Coke Company's men at all. I believe the rumour has been circulated in the newspapers only, or it has been a rumour from people outside us.

The GOVERNOR: Is Mr. Hutchins a member of the Strike Committee.

Mr. SHELLEY: No; there are many false reports circulated, which are utterly unfounded.

The GOVERNOR: It was reported as having been said in Hyde Park and at Peckham.

Mr. SHELLEY: It is false.

Mr. BRILL: I am upon the Executive, and I have never heard it.

Mr. WARD: I have known Mark Hutchins a long time; he was a stoker in our Company; and I have always found him a straightforward man.

Mr. BRILL: I asked Mr. Hutchins when it was first mooted whether he knew anything about it, and he said he knew nothing about it.

The GOVERNOR: You will all agree with me when I say that we never believed our men were so utterly foolish—and I may say more than foolish, wicked—as to contemplate doing a thing which would damage them far more than us, and which would be a great inconvenience to the public. But the British public are not cowards and fools; and if such a thing were to happen, as has been suggested, they would bear it, as they had borne other misfortunes, and would live through it, and the sympathy of the public would be alienated from you. I am glad to hear what you say, because it carried out our view of the character of our men—that they are sensible workmen, and are not likely to indulge in such fantastical ideas. But reverting to the business which Mr. Michael Henry has brought before us, and the two suggestions which he has made, I will take them in their inverse order. With regard to the first, the Company would be very glad to fall in with any proposition which should come from those representing the workmen for an alteration in the duration of their agreements. If it were better for them and for us, as no doubt it would be, there could be no possible reason why we should decline to entertain the question. With regard to the other matter—namely, our interfering in any shape or form with our workmen, and dictating to what Union they should belong, or to what branch of the Union they should belong—it would be, in the first place, illegal; and, in the second place, utterly contrary to our fixed policy, which is to leave our workmen perfectly free agents as far as we are concerned. They give us their services, and we pay them their wages by mutual agreement, but beyond that we have no right to interfere with them, and say whether they should join a Union or not join a Union. We recognize their perfect freedom either to work or not to work; or to work upon such terms as may seem to them desirable and equitable, and if they cannot get these terms, to refuse to work. But we should not feel inclined, and I may say we should not be legally entitled, to use any influence whatever to induce them to either leave a Union or join a Union; and though we quite see the force of what has been said from your point of view with regard to the difficulty of dealing with a divided body, it is not in our power to do anything towards making them join together.

Mr. HENRY: It is a matter as to which we desired you to know what our view was.

The GOVERNOR: I will finish what I am saying. Supposing we were to take such action, and our men resented it, what would be the consequence?

Mr. HENRY: It would be very unadvisable.

Mr. SHELLEY: As one of the Executive, I would say this: We do not wish you to take action. We merely referred to it as a suggestion, and if you had thought it worth your while to act upon it, you would have done so; but we do not press it. We can have an interview with the men themselves upon the matter. However, as we were bringing one question under your notice, we thought we would bring the other, though we do not urge it.

The GOVERNOR: I am glad to hear you say so. It would be better for all of us if we were to consider it withdrawn, and as not being a suggestion.

Mr. HENRY: It would be desirable if it should be so. We wish you rightly to understand our position. We have a good many men, who are members of our Union already, who are in your employment; and while we do not want to call out the coal porters in your employ, they

could be called out, and it would necessitate the probable calling out of our coal porters too. It is a danger to us as a body while there are these divided bodies; but we can arrange that matter easily amongst ourselves. There is another question I wish to bring before you.

Mr. SHELLEY: I think there has been enough said. There are so many foolish rumours afloat, that it would not be desirable to bring them under your notice. I think that if we see the men and tell them the advisability of doing what we suggest, we have persuasive powers enough to induce them to take our view. We should point out to them that they are liable to be called out through the errors of the gas stokers. I think, perhaps, if you were to mention it to your men they might take it in the wrong spirit, and think you were dictating to them about it. If I were in their position, I should think so myself. I believe I am endowed with mind enough to judge for myself. But perhaps you will consider the question of the monthly agreement, which is an important feature.

The GOVERNOR: We should be quite prepared to consider any proposition of that kind coming from those representing the workmen.

Mr. SHELLEY: I am a practical man of over 20 years' experience as a coal porter.

The GOVERNOR: You see why it would be undesirable for us to push the matter forward. It would be said at once that the Directors wish to smash the Union.

Mr. SHELLEY: Yes; and I see it in another light also. I think we are asking too much in desiring you to dictate to such a body of men without their consent. When I think the matter over, it seems to me to be so.

Mr. HENRY: There is a report this morning, which we look upon as a foolish report, that a collection has been made from your men at Nine Elms.

The GOVERNOR: You may put that report in the same category as the others. We are told that every barge going down the river, which ought to stop at Fulham, is allowed to go past Fulham and to go on to the South Metropolitan Company. We must take these reports for what they are worth.

Mr. SHELLEY: I should think you gentlemen of too much honour to do that.

The GOVERNOR: What we feel, and what you feel no doubt, is that our interests are the same in this matter. If we as sellers and you as producers quarrel amongst ourselves, we shall not sell as much, and there will not be much to divide amongst the men.

Mr. SHELLEY: It is mutual, is it not?

The GOVERNOR: Certainly.

Mr. HENRY: We do not like strikes.

The GOVERNOR: I am glad to hear you say so.

The deputation then withdrew.

The Lead-Poisoning Inquiry at Sheffield.—The Sheffield Corporation Water Committee have arranged that the Sub-Committee appointed to inquire into the question of lead-poisoning by the water supply should sit, with Professor Dewar and Mr. T. Hawksley, on Tuesday and Wednesday, the 18th and 19th inst.

The Leeds Gas Committee and the Price of Coal.—The Gas Committee of the Leeds Corporation, at their meeting yesterday week, had under consideration a quotation for 10,000 tons of coal at a price 3s. higher than was paid by the Corporation for the same quality of coal last June. It was decided not to concede the advance asked.

The "Unsightly" Electric Lighting Poles at Weybridge.—The electric lighting installation at Weybridge is to have a fair trial; and then the poles on which the wires are suspended, and which have greatly offended the eyes of a number of the inhabitants since October last, are to be removed. A Vestry meeting has been held at which Mr. H. Yool, J.P., stated that, in November, he wrote a letter to the Board of Trade, informing them that the installation was in progress, and requesting them to take such steps as they thought proper for the safety of the public. He had since received from the Board a report by Major Cardew, who considered that the most serious matter in connection with the installation was that the overhead wires erected were not in accordance with the Board of Trade regulations for high-pressure service, as regarded the insulating covering. After this statement, it was decided that, having regard to the danger and objections in connection with the overhead electric lighting of the parish, arrangements should be made for placing the electric conductors underground as soon as the experimental lighting had been fairly tried.

The Bridlington Local Board and the Public Lighting Contracts.—The Bridlington Local Board, at their meeting last Tuesday, placed themselves in an extraordinary position with respect to the public lighting; and there is the possibility of the town being without the means of illumination after the expiration of the present contract for gas on the 25th prox. Tenders had been advertised for the lighting of the district, either by gas or electricity. Two tenders were received—one from the Gas Company, offering to light the lamps by gas at 35s. 6d. each for 1200 hours; and the other from Messrs. Lang, Wharton, and Down, who proposed to put down 28 electric arc lamps and 160 Edison-Swan incandescent lights for £900 a year on a contract for five years, or £920 per annum for three years. Dr. Redman, in moving that the electric light be adopted, submitted that £800 a year was now paid for light equal to 5000-candle power; and for the outlay of an additional £100 a year, they would get light equal to 60,000-candle power. Mr. Creaser rose to move that the Gas Company's tender be accepted; but it was ruled that, being a considerable shareholder in the Company, he could not do so. It was, however, moved as an amendment by Mr. Heselton. The question then arose as to the legality of shareholders in the Gas Company voting on the question; and it was held that, whilst they could not vote in favour of the Company's tender, they were not debarred from voting against the electric light. The amendment, being only supported by three votes against four, was lost. Four votes were recorded for the original motion, and six (including three gas shareholders) against it; and this also was declared lost. Both tenders were thus rejected; and if some arrangement is not entered into before the existing contract for gas expires, the town will be left in darkness.

THE SALFORD GAS SCANDAL.

Statement by the Mayor—The Hunter Compact.

At the Meeting of the Salford County Borough Council yesterday week—the MAYOR (Mr. B. Robinson) presiding—there was a long discussion on matters relating to the gas scandal.

The MAYOR said it was due to himself and to the interests of the Council and the public, that he should make a short statement, with a view, if possible, to remove some of the very erroneous impressions that had found credence in the columns of a portion of the press, and to some extent in the mind of a section of the public. He reminded the members that a small Consultative Committee was formed, with whom the Town Clerk could confer, with special powers to institute and carry on legal matters, and to act according to the best of their judgment by prosecuting or otherwise any action they, in the interests of the Corporation, might deem expedient. This work had been, and was still quietly but persistently carried on, with a view not of denouncing malpractices, but of punishing all those who had been guilty of defrauding the Corporation either directly or indirectly, and against whom any evidence could be obtained. Of necessity such proceedings were of a delicate nature, and required to be undertaken with the greatest circumspection. To proclaim from the housetops all the information the Consultative Committee or the Town Clerk possessed, would simply be to supply the enemy with dangerous weapons absolutely fatal to the object in view. In all sincerity he asked the Council to exercise a little patience, and to have confidence that the Consultative Committee were doing everything that lay in their power to bring to justice all evil-doers against whom they could obtain evidence. He hoped the Committee would shortly be in a position to give an account of their doings; and he did not doubt that the majority of the Council and the reflecting public would receive their report with satisfaction.

Mr. RYCROFT inquired whether the motion of which he had given notice, and which had been sent too late to appear on the *agenda* paper, would be taken at the end of the ordinary business. The motion was to the effect that he should be allowed to inspect the contract alleged to have been entered into in or about the month of August, 1889, by or on behalf of the Corporation, with Samuel Hunter.

The MAYOR said the notice of motion was received too late.

Mr. RYCROFT said he understood the Mayor to say a few days previously that the Town Clerk advised him the motion was out of order. If this was so, then he would like to raise the question of order, because it was a very serious matter.

The TOWN CLERK said the ground on which the motion was out of order was that Mr. Rycroft had altogether misinterpreted the Municipal Corporations Act of 1882. The Act would not bear any such interpretation as he put upon it; and he had not the slightest hesitation in saying the motion was out of order.

Mr. RYCROFT protested against this ruling.

Mr. MIDDLEHURST asked why the following motion, of which he had given notice, had been ruled out of order:—"(1) That the agreement alleged to have been made by the Consultative Committee appointed on behalf of the Council on the one part and Samuel Hunter or his representatives of the other part be produced to the Council, and that a printed copy thereof be supplied to each member of the Council. (2) That any proceedings against Mr. Ellis Lever or others in connection with commission alleged to have been paid to Samuel Hunter be suspended until the sum of £10,000, the amount stated to be payable by Samuel Hunter and others in settlement of the action commenced against them, be paid into the hands of the Borough Treasurer. (3) That before any proceedings are instituted by the Consultative Committee, notice of the intention to institute such proceedings, with particulars, be given in the minutes and subjected to the Council for sanction. (4) That the costs, charges, and expenses incurred by the Consultative Committee of the Salford Corporation, in their several actions against Hunter and others be furnished to the Council within one month."

The MAYOR said the discretionary power rested with himself; and he considered that the whole motion would be out of order and detrimental to the proceedings now taking place.

Mr. DESQUESNES subsequently moved—"That the Consultative Committee be requested to present to the next meeting of the Council an interim report of their proceedings and transactions since the date of their last report, but reserving such information (if any) as it may be prejudicial to the interests of the Corporation to include in such report, in view of any pending litigation." He observed that at the meeting held on March 6 of last year, the Council adopted a resolution enlarging the powers of the Consultative Committee in dealing with litigation against Hunter and the contractors. Power was given to the Committee to arrange or settle all matters that might arise in such actions, and to report their proceedings to the Council from time to time. They had carried out the first half of the resolution; but with reference to the second, he thought they had not done so well.

Mr. CORBETT, in seconding the motion, remarked that he thought, in view of the statements which had been made by members of the Committee, it was desirable an interim report should be presented.

Mr. MIDDLEHURST considered the motion was too mild; and he suggested that the mover should embody in it the two first clauses in the resolution of which he (Mr. Middlehurst) had given notice.

Mr. DESQUESNES declined the suggestion.

Alderman M'KERROW said the only objection he had to the motion was that it seemed to imply distrust in the discretion of the Committee. The Committee were, of course, bound to report to the Council in due time; and they knew best when it would be discreet to do so.

Mr. PHILLIPS (a member of the Consultative Committee) said he had not the slightest objection to the Committee giving all the information it was possible to give, and would therefore vote for the resolution. With regard to the agreement with Hunter, the Committee were perfectly willing that it should be presented to the Council when the right time came.

Alderman HUSBAND thought the Committee would do well to be reticent until the time arrived for speaking. Events were marching on rapidly; and the public would be in possession of all this interesting information before many months were over.

Alderman WALMSLEY said that, as a member of the Committee, he had not the slightest objection to the resolution.

Mr. STEPHENS asked whether the £10,000 which it had been agreed Hunter should pay over to the Corporation on Dec. 31 had been received; and if not, why not?

The MAYOR replied that the £10,000 was perfectly safe; but there were reasons why they had not received it.

Mr. RYCROFT said he did not oppose the resolution; but he thought it would have been more fitting if the request contained in the resolution had been addressed to the Town Clerk. The litigation was commenced without the sanction and without the authority of the Consultative Committee. He thought the report should indicate the terms of the arrangement with Hunter, as he did not see how the publication of the agreement could be prejudicial to the Corporation in the proceedings now pending, in which the question was whether the defendants in the actions, at a certain time long before the agreement was made with Hunter, had paid bribes to Hunter. He complained that the agreement had not been laid on the table in Committee. He did not object to the taking of the actions; but the Corporation should be fair all round. They should not settle with one and proceed against another. Within twelve years one contractor had supplied 165,500 tons of coal and cannel; and Mr. Lever had only supplied 33,500 tons. Mr. Lever was now being sued for something above £3000; while the gentleman who supplied the 165,500 tons had settled with Hunter for a sum not exceeding £1000. The sums paid by that gentleman and the other contractors ranged from £250 to £1000; the aggregate amount paid in settlement of twelve claims being £4875. But the most curious part of the business was that the settlements were not made with the Committee, but through Hunter's solicitors. A more disgraceful settlement he never knew of. He believed the main reason why he was not allowed to inspect the agreement was this, that if he did he should find that, Hunter not having paid the £10,000, the Corporation were entitled to claim freedom to take their own proceedings in their own way. If that was so, he thought it was their duty to get rid of this disreputable arrangement. They had no right to extend the time to Hunter for the purpose of enabling him to net £3000 from anybody else. It was an altogether novel proposition that a solicitor—the Town Clerk was a solicitor—should refuse to show to his clients a document belonging to them.

The MAYOR observed that when the matter was mentioned in Committee, the Town Clerk said he would produce the agreement if it was desired; but if he did, he could not be answerable for the successful issue of the negotiations. Mr. Rycroft then moved that the agreement should be produced; but he did not find a seconder.

Alderman DICKINS said as to the agreement with Hunter, there appeared to be an idea that there was something very mysterious about it. He (Mr. Dickins) had not seen it, and did not want to see it. The time was fast approaching for Mr. Lever to answer interrogatories; and he expected that before it was necessary to draw up the report which Mr. Desquesnes desired, the whole affair would be completed. He said in all honesty that it was a disgraceful proceeding that they were bound to accept certain sums of money through Hunter; but it must be remembered they were only recovering a debt. If Mr. Lever had conformed to what had been proposed, as the other contractors had done, the whole thing would have been settled. It was really only in the discharge of a public duty that the action against Mr. Lever had been taken.

The TOWN CLERK said Mr. Lever had not been singled out as had been suggested. Everyone against whom there was a particle of evidence had been proceeded against as far as he knew. Mr. Lever was anxious to get the agreement, the production of which would be most prejudicial to the interests of the Corporation. All this discussion would appear in the press; and Mr. Lever would make it an excuse for further delay in answering the interrogatories.

After some further remarks, the resolution was put to the meeting and adopted.

ROTHERHAM CORPORATION GAS SUPPLY.

A Proposal to Abolish Gas-Meter Rents.

At the Monthly Meeting of the Rotherham Town Council last Wednesday, the Gas Committee made various recommendations, to which an amendment was moved by Mr. Gummer, aiming at the abolition of the gas-meter-rents. The present amount realized by the gas-meter rents, he said, was £543 a year; and he also reminded the members that the Corporation would shortly cease to supply the Rawmarsh Local Board with gas—the latter authority having about 600 consumers. At the present time they had in the borough 3273 consumers; and in 1887 they had 3213. He attributed the increase to the meter-rents having been reduced; and he contended that if they were abolished in the borough, where there were 8145 houses, there would be a large increase in the number of consumers and in the quantity of gas consumed. The average consumption of a householder was 2000 cubic feet; and if they had 6000 consumers, he pointed out that they would realize a much larger profit. Gas, as at present manufactured, cost 9d. per 1000 cubic feet; and, including the establishment expenses, &c., the cost was 1s. 11d. An extra distribution of gas would not increase the management expenses. Consequently every penny they obtained beyond the 9d. per 1000 feet would be profit; and if the meter-rents were abolished, in a few years the profit on the gas-works would be much larger. Mr. Cox seconded the motion. Alderman Neill and Mr. Hirst opposed it, arguing that the time was inopportune; and the Mayor (Mr. R. Jenkins) suggested it would be wiser to wait until the extensions of gas-mains to Thorpe, Scholes, Whiston, and Templeborough had been carried out. The motion was rejected by seven votes to five.

Advance in the Salaries of Officials in the Belfast Corporation Gas Department.—At their meeting last Saturday week, the Belfast Corporation, on the motion of Sir John Preston, seconded by Sir William Ewart, made an all-round advance in the salaries of the officials of the Gas Department; the principal increases being: £100 to the Engineer (Mr. J. Stelfox); £25 to the Assistant Manager; £25 to the Chief Inspector; and £15 to the Accountant.

THE DERBY CORPORATION AND THE GAS COMPANY'S BILL.

At the Quarterly Meeting of the Derby Town Council last Wednesday, the following resolution engaged the attention of the members:—"That the Bill now being promoted in Parliament for the granting of further powers to the Derby Gaslight and Coke Company be opposed by the Corporation of Derby, and that the costs, charges, and expenses of and incidental to the opposition of such Bill be paid out of the borough fund and rate."

In moving the adoption of the resolution, Alderman Hobson stated that the Parliamentary Committee had gone thoroughly into the clauses of the Bill; and they were unanimous in deciding that the Bill should be opposed. The Company were applying for power to raise £200,000, in addition to their existing capital. This, in the judgment of the Committee, was in excess of the power possessed by nine out of ten of the leading gas companies of the country. They also proposed to expend £34,000 on new lines of railway for carrying coals. This was entirely unnecessary, as they were in the midst of the Derbyshire coal-fields. The Company were not under any obligation as to the purity of its supply; and they required an independent testing place, easy of access to the borough. They sought further to acquire 20 acres of land for extension purposes. In order to give the Corporation a *locus standi*, they submitted the present resolution, giving them power to oppose the preamble of the Bill. There were other sources of supplying light; and, as the members all knew, the Corporation were, at the present time, encouraging an application to the Board of Trade for the supply of electric light. Alderman Longdon seconded the motion. In the course of the discussion which ensued, Mr. A. S. Haslam ventured to say that the Directors of the Company performed their duties thoroughly well, and were the best judges of their requirements. The Council ought not to go before the Committee of the House of Commons in the character of factious opponents. He did not think the Directors would be anxious to lock up any more capital than was absolutely necessary. They only wished to provide for the future; and (like the Corporation) they did this to avoid the trouble and expense of going to Parliament any oftener than was absolutely necessary. He asked the Council not to throw obstacles in the way of the Company, increase unnecessarily the expense, and thus reduce the chances of the price of gas being lowered. Mr. Marsden said they had no idea of factious opposition; and therefore he thought Mr. Haslam had misused the word in that connection. Alderman Sowter asked whether the Committee had taken into consideration the desirability of purchasing the gas-works. If so, he would like to know what they would have to pay in the future for this additional capital. Alderman Hobson said with regard to Alderman Sowter's question, the Committee kept an open mind. They were at any time prepared to receive overtures from the Gas Company. The resolution was carried unanimously.

TAUNTON ELECTRIC LIGHTING COMPANY, LIMITED.

The Annual General Meeting of this Company was held at Taunton on Monday evening last week—Mr. J. H. BALE in the chair.

The report presented by the Directors stated that the number of shares allotted was 2205, on which £9793 had been received. The accounts showed a balance of £352 9s. 10d.; and the Directors recommended the payment of a dividend of 5 per cent., free of income-tax. This would take £352 9s. 5d.; and the balance carried forward for a reserve and depreciation account would therefore be nearly the same as before—viz., £207 14s. 2d. It was further stated that, in addition to the Taunton business, the Company had carried out temporary installations in Bath. The accounts accompanying the report showed the total receipts on capital account up to Dec. 31 last to have been £12,793, out of which £10,921 18s. 11d. had been spent on plant. On the above-named date, there was an unexpended balance of £1806 9s. 5d. The following are the items of general income and expenditure for the past year:—

Income.

Rental of lamps, electrical apparatus, &c., sold, and installations carried out	£1511	15	0
Bath installation (per Mr. Massingham, the Managing Director)	920	0	0
Stock in hand on Dec. 31, 1889	298	1	1
	£2729	16	1

Expenditure

New apparatus and renewals	£444	15	6
Wages and salaries	394	5	6
Payments—Bath installations	259	14	2
Coal and firewood	454	5	6
Rent, taxes, and water	207	18	0
Printing, stationery, stamps, and general trade expenses	56	1	2
Directors' and auditors' fees	57	4	6
Interest on debentures	146	5	0
Bank interest	11	6	3
Law costs	4	10	10
	£2036	6	5
Stock in hand, Dec. 31, 1889	340	19	10
Balance	352	9	10
	£2729	16	1

The profit and loss account showed that the balance brought from the 1888 account was £479 14s. 2d., of which £272 0s. 5d. went to pay dividends for that year; leaving £207 13s. 9d. Adding to this the balance above shown (£352 9s. 10d.), there was a total of £560 3s. 7d., which allowed of the payment of the dividend recommended, with a balance of £207 14s. 2d.

The CHAIRMAN, in moving the adoption of the report, referred to the steps taken by the Directors to obtain a new site for their depôt. After purchasing a piece of land which turned out to be unsuitable, they had secured another, which, he believed, would serve their purpose admirably,

being situated almost in the centre of the town. The work of putting down the machinery was in progress; and he hoped that in two or three weeks' time they would be in full working order.

Mr. W. POTTER seconded the motion, and it was carried.

The retiring Directors (Messrs. Fowler, Lance, and Winter) having been re-elected,

Mr. MASSINGHAM proposed—"That in future years the annual general meeting of the Company be held any time during February that the Directors may think fit." He said that by the Articles of Association they were obliged to hold the annual meetings on the first Monday in February; but the Directors had found this to be inconvenient, as it followed too closely upon the end of the year, and the accounts had to be rather hurried through. As they were expecting to extend their business, this difficulty would be increased; for it would take a longer time to prepare the accounts. Referring to the affairs of the Company, he said that during the past year they had been placed at considerable disadvantage because of the large expenditure incurred, while the income could not be increased at anything like the same proportion, because they could not meet the demands of the would-be consumers. He concluded by reviewing the work of the year.

The motion was carried; and a vote of thanks to the Chairman terminated the meeting.

THE LIGHTING OF COURTS IN BIRMINGHAM.

IN last week's JOURNAL, there appeared an epitome of a report by the Town Clerk of Birmingham, on the subject of the lighting of the courts of the city; and it was mentioned that the Public Works Committee intended recommending the City Council to make an order declaring thirty selected courts and terraces to be private streets not lighted to the satisfaction of the Corporation, and to resolve, in accordance with section 46 of the Consolidation Act, to provide the proper means for lighting them. This recommendation was brought before the Council last Tuesday by the Chairman of the Committee (Mr. Lawley Parker). Having reminded the Council of the easy terms upon which the Gas Committee were willing to supply gas to, and maintain a lamp in a court or terrace—the total cost being for a court of ten houses only about a halfpenny a week per house—he said that the courts it was proposed to light averaged nine-and-a-half houses each. The expense was not an exorbitant one; and, considering the advantages to the tenants, he thought it would be a very proper thing if the owners themselves volunteered to light the courts. He was hopeful that this would be found to be the case; and if it should be, it would not be necessary for the Corporation to put in force the power they had in the matter, or to obtain the law on the subject. The cost of providing the means of lighting would average about £5 5s. per lamp; and there was no question that, whatever the law might be on the subject of lighting, it was the duty of the owners to provide the means of lighting. Mr. Brinsley considered it would satisfy the inhabitants of the city if the owners paid all the expenses of putting the lamps in; and the Corporation did the lighting and repairing. The motion having been seconded by Mr. Whateley, Mr. Davis inquired whether the Gas Committee could not reduce to the net cost price the charges for putting in the service and maintaining the lamps in the courts. Mr. Osler hoped that the Gas Committee would go a step further, and offer to do the lighting, &c., at cost price. Alderman Pollack said that the gas for lamps in courts was supplied at far below the cost price. The charge per annum was 17s. 6d.; and the cost to the Gas Department was 26s. 6d. If the gas were charged for at the same price as to ordinary consumers, it would be 36s., or 18s. 6d. more than was charged to the owners of courts. With reference to the services, communications had been passing between the Public Works Committee and the Gas Committee; and the latter had declared their readiness to lay their services at cost price, and to spread the charge over five years. An amendment was moved by Mr. Brinsley, and seconded by Mr. Thomas, to the effect that the Council should compel the owners of courts to provide the means of lighting, and then light the courts at the public expense. The Mayor (Mr. F. C. Clayton) intimated that the amendment would be put as an additional resolution after the original motion had been carried. Mr. Parker observed that, if Mr. Brinsley's motion were carried, it would mean an increase of about £10,000 a year in the rates. The resolution was carried unanimously. Aldermen Lloyd and Avery then expressed the hope that Mr. Brinsley would not press his motion, and that gentleman afterwards consented to withdraw it.

The Use of Water-Meters for Trade Purposes at Uxbridge.—Water-meters are in future to be used at Uxbridge, at the discretion of the Local Board, for the supply of water to persons using the Board's water for business or special purposes.

Holmfirth Water Supply.—With a view of improving the water supply of the district, the Holmfirth Local Board have given instructions for a boring to be made at Snape, to ascertain whether or not water in sufficient quantity can be obtained in that locality.

The Quality of the Kingston-upon-Hull Gas Company's Supply.—The minutes presented by the Sanitary Committee at the meeting of the Hull Town Council last Friday, contained a resolution proposing to prosecute the Kingston-upon-Hull Gas Company for a nuisance in connection with the supply of "foul" gas in the old town. The Town Clerk read a letter from the Secretary of the Company (Mr. F. A. Scott), in which he stated that the cause of the impurity of the gas arose from the unprecedented demand made upon the works during the last two months having been too much for the purifying power, and the Company were unable to dry the coal (supplied from the collieries in a wet state) before placing it in the retorts. The Manager, however, did not anticipate any further difficulty. In the discussion on the matter, the nuisance from the gas was described as having been "intolerable" and "unbearable." Mr. Robson, a Director of the Company, acknowledged that there had no doubt been a breakdown at the works; but since the previous Tuesday the gas had been in proper form. The minutes were adopted.

THE PROPOSED PURCHASE OF THE WARRINGTON WATER-WORKS BY THE CORPORATION.

Negotiations are still proceeding between the representatives of the Warrington Corporation and the Water Company in reference to the proposal of the Corporation to acquire the Company's undertaking. It is stated that the terms offered by the Corporation have been declined; but the Company have named a figure at which they would be disposed to sell. The Corporation's great difficulty is understood to be that of the sinking fund. The rates of the town are already sufficiently high; and it is feared that the ratepayers would not consent to any serious addition to their burdens on account of the purchase of the Company's business. No figures relating to the negotiations have been published officially; but the local newspapers contain a statement which may be taken as giving, more or less accurately, the position of affairs. From this it appears that the Company have a paid-up share capital of £75,000, made up as follows:—£30,000 on which they are entitled to 10 per cent. per annum (being their maximum dividend), equalling £3000; £15,000 entitled to, and receiving 7½ per cent. per annum, equalling £1125; £30,000 entitled to, and receiving 7 per cent. per annum, equalling £2100; total, £6225. They have also £40,000 preference stock, entitled to, and receiving 4½ per cent. per annum, equalling £1800; making a total of £8025. There is likewise borrowed capital of £26,819; bringing up the total capital account to £141,819. In the half year ended June, 1889, the gross revenue was £5522; and after deducting £1694 for expenses, there was a sum of £3828 available for dividend, &c. Doubling this gives £7656 as the year's income, which is insufficient to cover the £8025; but the report for the half year ended December last, recently issued, states that "the income of the Company has exceeded the amount required to pay the full maximum statutory dividend on all classes of shares." The difference between the Company and the Corporation is stated to be one of three years' purchase. The Corporation have offered 27 years' purchase, and the Company decline to negotiate except upon the terms of 30 years' purchase. The Corporation, if they become purchasers, would have to take over the loan debt of £26,819; and in the event of a 30 years' purchase being the ultimate issue of negotiations, the following result would ensue:—The present capital liability of the Company is, as above shown, £141,819. Now, 30 years' purchase would mean £240,750; and the loan debt is £26,819—together, £267,569; showing a difference in favour of the selling Company of £125,750. A purchase on the basis of a 30 years' term would give this further result to the ratepayers:—The annual sinking fund in respect of the price of £240,750 would be, using a 60 years' term, £240,750 ÷ 60, £4012; annual interest on £240,750, at 3¼ per cent., £7823; annual interest on £26,819, at 3¼ per cent., £872—total, £12,707; the annual revenue being £7656, the annual difference for the time being against the ratepayers would be £5051. If £600 represents a rate of 1d. in the pound, then this £5051 would mean a little more than 8d. in the pound, in addition to the present rates. On the other hand, ratepayers might obtain, as they did in the case of the purchase of the gas-works, a postponement of any payment to the sinking fund for a few years; and they would, of course, benefit by any increase in the revenue. If the Corporation could buy at 27 years' purchase, they would save £24,075. From the shareholders' point of view, the question is, of course, one of re-investment to produce the same return as for the original capital. If they accept the lower figure, they will be in the position of requiring about £3 13s. per cent. to produce the same annual income; while at the higher price £3 6s. 8d. per cent. would suffice. It is, as the compiler of these figures remarks, a question solely of what is the fair and just term.

Para Gas Company, Limited.—In accordance with the resolution passed at the ordinary general meeting of this Company (*ante* p. 155), an adjourned meeting was held last Thursday, when a resolution was proposed, and adopted, declaring a dividend at the rate of 7 per cent. per annum on the preference shares for the half year to Sept. 30 last.

A Great Flood at Lake Vyrnwy.—Mr. G. F. Deacon, the Water Engineer to the Liverpool Corporation, has reported that the largest flood at Vyrnwy since the commencement of impounding in November, 1888, took place on Saturday, the 27th ult.; the water flowing over the dam at the rate of 900 million gallons a day. No damage was done.

The Question of Salaries in the Bolton Corporation Gas Department.—An animated debate ensued upon the introduction of the Gas and Lighting Committee's proceedings at the meeting of the Bolton Town Council last Wednesday. The Committee declined to advance the wages of the lamplighters from 21s. to 23s. per week (about 44 hours); and the labour representatives moved an amendment. The Chairman of the Committee said they had advanced the salary of Mr. Smith, the Gas Manager, from £450 to £500 per annum; but Mr. Smith did not think this sufficient, and he accordingly wrote withdrawing his application for an advance. A formal amendment as to this portion of the proceedings was carried without discussion; and then the amendment of the labour party, granting the lamplighters an advance of 1s. per week, was brought forward. It was defeated by 27 votes to 16; and a subsequent amendment, referring the whole matter back to the Committee, was rejected by 25 votes to 11.

The Cardiff Corporation and their Reservoir Contractor.—The claim of Mr. W. Jones, in respect of the contract for the Cantref reservoir of the Cardiff Corporation (to which reference was made in the last volume of the JOURNAL) appears to be approaching settlement. At a recent meeting of the Water Committee, the Chairman (Alderman Jones) reported the result of the deliberations of the Sub-Committee appointed to deal with the matter. The various items, he said, had been thoroughly investigated; and the Sub-Committee had decided to recommend the payment of £8650, as the balance due to Mr. Jones. The Mayor (Alderman Sanders) remarked that originally the claim was £56,000. Then it was brought down to £27,513. But before the Sub-Committee began their sittings, the amount stood at £22,320; and now the figure was £8650. On the proposition of the Chairman, seconded by Alderman Waring, the proceedings of the Sub-Committee were approved, and recommended to the Council for ratification.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday*.

Mr. Daniel Ainslie, a prominent citizen of Edinburgh, and for a number of years a Director of the late Edinburgh Gas Company, died in Edinburgh yesterday morning. Mr. Ainslie was one of the Directors who signed the minute for the dissolution of the Gas Company in November last.

The Dundee Gas Commission had a lively meeting on Wednesday. Mr. M'Crae's report showed that during December the output of gas was 68,534,000 cubic feet—an increase of 826,500 cubic feet over the output of December, 1888; and that the coal carbonized amounted to 6933 tons, or an increase of 465 tons. The rental collected during the nine months ending with January was reported to have been £35,284, which, although a reduction of 2d. per 1000 cubic feet was made on May 1 last, was only £757 below what was collected in the corresponding period of the previous year. The lively part of the proceedings began when Mr. Brownlee, one of the oldest of the Commissioners, raised a question as to the quantity of gas consumed on the works. It seems that prior to the beginning of 1885 the quantity was guessed at about 2,500,000 cubic feet; but that then Mr. M'Crae caused meters to be put in, with the result that the actual consumption was found to be 5,000,000 cubic feet. Mr. Brownlee began by raising a quibble about when the meters were put in, and Mr. M'Crae at once admitted that he had mistakenly informed the Works Committee that it was in 1886 instead of 1885. He also reported that having been in communication with other towns, he had ascertained that the percentage quantity of gas consumed in the various works was as follows:—Glasgow, ·75; Paisley, 1·01; Newcastle, ·83; Dundee, 1·41; Carlisle, 1·12; Edinburgh, ·47; Leith, ·51; and Aberdeen, 1·22. In these places the percentage of unaccounted-for gas was as follows:—Glasgow, 10; Paisley, 10·8; Newcastle, 13·34; Dundee, 8·54; Edinburgh, 8·23; Leith, 8·25; and Aberdeen, 8·5. Mr. Brownlee's next objection was to the keeping of the register of the works meters in a fly-leaf at the end of the book, and not alongside the ordinary register; to which it was replied that the meters were not the same as those supplied to customers. Mr. Brownlee insinuated that the meter-books for the works had been written up at one time, and not regularly kept, but this Mr. M'Crae, with some feeling, denied, pointing out that it was impossible for him to manufacture the figures. Appealed to by Mr. Lindsay if he had any motive to disclose it, Mr. Brownlee waxed hot, and stated that he wanted information because he considered the quantity of gas consumed on the works was far too high. There had, he considered, been laxity in the management at the works; and it would be his duty to try and bring about a better state of matters. Mr. Gentle characterized Mr. Brownlee's manner of treating the subject as execrable; but moved that the Visiting Committee be instructed to report on the number of burners in the works and the time they are kept lighted. To this proposal Mr. Brownlee assented; but launched into the question of coal analysis, a return of which he wanted in order that he might judge which was the best coal to purchase. Mr. Gentle replied that the Gas Manager was best able to recommend the sort of coal they should use; and Mr. Lindsay, the Convener of the Works Committee, also stated in reply that in selecting coal they were largely guided by Mr. M'Crae, on whose engineering and technical skill they were to a large extent dependent. Mr. Gentle's motion was agreed to unanimously; and the unpleasant incident terminated without having served any practical purpose. At a meeting of the Town Council on Thursday, Mr. Brownlee again figured as a malcontent. This time he thought that a minute of the Council on electric lighting should be reserved, because, in his opinion, it committed them to an enlargement of the Gas Commission by the addition to it of seven members from the Town Council, and contradicted a minute of Jan. 22 last. He apparently objected to the mode of increase by members of the Town Council, and the number seven being fixed, as it might tie their hands in future. After remarks by Mr. Gentle, who did not see any contradiction in the two minutes, Mr. Brownlee's propositions was not adopted, and he dissented.

A new water supply for the village of Stanley, in Perthshire, which has been constructed at a cost of £3000, was turned on with great *éclat* on Saturday last—the Duke of Athole performing the ceremony. The water is gathered on the neighbouring hills eight miles off, and for a village of 1100 inhabitants, the undertaking is a large one. The supply is equal to 30 gallons per head per day to a population of 4100. The proceedings of the day included a display with water hose in the public square of the village, the firing of cannons on a hill overlooking the place, and a banquet, all of which were carried out with a great deal of enthusiasm.

From our Glasgow Correspondent.

GLASGOW, *Saturday*.

When the last fortnightly report on the collection of the gas rents was made by Mr. Fleming, Treasurer to the Glasgow Gas Trust, on the 29th ult., it was found that the receipts for the eight months of the financial year then completed amounted to £131,706 19s. 4d., as compared with £132,126 7s. 1d., thus showing a decreased revenue to the extent of £419 7s. 9d. Against this fact, however, it should be remembered that the price of gas this year is 2d. per 1000 cubic feet less than it was during last financial year.

There has been quite a decided foggy atmosphere in the Glasgow district (as also in many other parts of Scotland) during the past two or three days. On Thursday the fog was more pronounced and persistent than on any day since last winter. Indeed, the consumption of gas during the 24 hours ending at six o'clock yesterday morning amounted to 15,921,000 feet, whereas the demands made upon the three gas-works of the Corporation during the corresponding period of last February did not exceed 11,900,000 feet; and for the same period of February, 1888, it was only 11,086,000 feet. It will thus be seen that there was an increased consumption on Thursday-Friday, amounting to 4,021,000 feet over Feb. 7, 1889.

The make of gas at the three Glasgow gas-works during the month of January reached a total of 415,030,000 cubic feet. On a number of days it amounted to considerably over 15 million feet per 24 hours. For the corresponding month of last year, however, the make did not exceed 400,827,000 feet. The past month's make shows an increase of 14,203,000 cubic feet, or rather more than 3·4 per cent., which may be regarded as a very satisfactory increase when it is remembered that the electric light is making very decided headway in certain quarters.

Mention was made in my "Notes" a month ago of the fact that in the Town Council of Hawick there had been displayed some indignation at the character of a communication from the Secretary of the local Gas Company regarding escapes of gas from the street-mains due to breakages from the use of the municipal road-roller; the said escapes not having been duly reported in the proper quarter. The subject again came up last Tuesday evening at the monthly meeting of the same body. A letter was read from Mr. Grier, the Gas Company's Secretary, stating that the letter from the Council had been laid before the Directors, who, having made further inquiry found that no information as to the escapes of gas had been given to the Company's officials by any of the town's officials or servants, and they respectfully asked that the Council should make further inquiry into the facts of the case, and ascertain which of the town's officials gave information of any of the fractures in question, and to which official it was communicated. Mr. Grier also sent a copy of a report on the subject from Mr. Smith, the Manager of the gas-works, in which that gentleman mentioned four breakages of street-mains which had been reported to him during the month of December; but not in any instance by an official or servant of the municipal authority. Councillor Eckford moved that Mr. Smith's report be remitted to Mr. Manuel to report upon to the Provost's Committee. The motion was seconded by Bailie Hogg and agreed to.

During the month ending the 14th ult., the amount of gas made at the Kilmarnock Corporation Gas-Works was 10,636,900 cubic feet, as compared with 9,446,300 feet made in the corresponding month last winter. These figures show an increase of 1,190,600 feet, represented in money value by £210 16s. 6½d., at 3s. 6½d. per 1000 feet. The illuminating power of the gas over the month was an average of 28½ standard candles. From June 14, 1889, the beginning of the financial year, up till January 28 there was an increased make of gas amounting to 4,059,000 feet.

The annual meeting of the shareholders of the Moffat Gaslight Company, Limited, was held at the Company's works yesterday, when the various recommendations of the Directors in their annual report were agreed to. These were that a dividend of 5 per cent. per annum be declared on the guaranteed shares; that a dividend of 7½ per cent. be declared on the ordinary shares; and that the price of gas be reduced from 5s. 10d. to 5s. per 1000 cubic feet, with a discount of 5d. per 1000 feet for prompt payment.

Yesterday afternoon Lord-Advocate Robertson received a deputation from this city representing various suburban burghs, on the subject of the lighting of common stairs, which has long been a very vexed question, not in the Glasgow district only, but also in many other parts of Scotland. His Lordship was urged to introduce a measure into Parliament giving powers to police burghs to supply the gas for stair illumination, and to have the lights extinguished by the burgh lamplighters. In connection with this matter, I may mention a curious state of affairs that has just been brought under my notice in respect of the payment of the stair gas account. On a certain common stair there are eight tenants, and the lighting is done by two gas jets, for which the landlord pays to the Glasgow Trust the sum of 25s. 8d., or 12s. 10d. for each light. Divided by eight, the sum means for each tenant 3s. 2½d.; but the landlord exacts from each a charge of 5s. per annum. There are some persons who wish to know if landlords have any authority for demanding such an extortionate payment. By a simple bit of legislation, the Lord-Advocate has it in his power to bring all such stair-lighting anomalies to an end.

There has been another very flat week in the Glasgow pig-iron market, and Scotch warrants have fallen in price from 56s. 3d. per ton cash on Monday to 51s. 9d., at which there were sellers yesterday afternoon. In hematite and Cleveland iron warrants, the fluctuations in price have been between 68s. 4½d. and 62s. 9d. per ton cash for the former, and between 55s. and 51s. 6d. per ton for the latter; while the closing prices yesterday afternoon were 63s. 7½d. and 52s. 1½d. per ton, respectively. The clearing-out process on the part of disappointed holders has been steadily going on during the week. It came to a climax on Tuesday, when, for a short while, there was a greater panic than has been seen on the market since the failure of the City of Glasgow Bank, about a dozen years since.

In the Glasgow coal trade buyers were inclined in the early part of the week to make slight concessions; but values speedily hardened again on Wednesday, on it becoming known that the Lanarkshire miners had resolved to enforce their demand for a further advance of wages. Many persons are complaining of the unnecessarily high prices of coal, especially such kinds as are used for manufacturing purposes; and it will be necessary for coalmasters to give heed to the complaints.

Brentford Gas Company.—The accounts to be presented at the meeting of this Company next Friday week, show that there is a sum of £71,760 available for division, which enables the Directors to recommend the declaration of the following dividends, subject to income-tax:—At the rate of 5 per cent. per annum on the 5 per cent. preference stock; at the rate of 12½ per cent. per annum on the consolidated stock; and at the rate of 9½ per cent. per annum on the new stock, 1881. The profit for the half year, the Directors point out in their report, has been necessarily diminished by the increased cost of labour; amounting, by reason of the shorter number of hours worked by the men and their higher rate of pay, to above 30 per cent. The demand for gas continues steadily to increase; and this necessitates greater manufacturing and storeage power. To meet these requirements, the Directors have decided to offer for sale (by tender), a further sum of £25,000 of new stock. A resolution will also be submitted to the proprietors at the forthcoming meeting to authorize the raising of additional capital in pursuance of the powers conferred by the Company's Provisional Order of 1881.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 8.

Sulphate of Ammonia.—As foreshadowed in these columns, the market displays considerable improvement; and although prices do not as yet show any marked advance, the decline has to a certainty been completely checked. The lower values seem to have precipitated the demand; and the market has become fairly well cleared for the time. There are now buyers at £11 17s. 6d. at Hull and elsewhere; and it is not improbable that £12 would be paid for best makes. Nitrate is inclined to be firm also; it being generally assumed that the proposed arrangement to limit the output will become a *fait accompli*.

LONDON, *Feb.* 8.

Tar Products.—Respecting prices, flatness all round has been the order of the week. Makers' stocks are low; but it is astonishing to see how greedy they are for orders. It is well known that many makers have oversold themselves in three of the principal products; and it remains to be seen how they will get out of this difficulty should buyers press for delivery before the season ends. The production of tar generally is disappointing; and whether this is due to the application of some modification of the Dinsmore process—such as passing the gas through red hot retorts before it gets to the hydraulic main, and by this means fixing the lighter tar products into gaseous form, remains to be seen. Very little business has transpired during the week; and most of the following prices are nominal:—Tar, 25s. to 30s. per ton, according to position. Benzol, 90 per cent., 4s. per gallon; 50 per cent., 3s. 3d. Toluol, 2s. 1d. per gallon. Solvent naphtha, 1s. 10d. per gallon. Crude naphtha, 1s. 3d. per gallon. Light oil, 4½d. per gallon. Lucigen creosote, 3d. per gallon. Ordinary creosote, 2½d. per gallon. Carbolic acid, 3s. per gallon. Anthracene, (30 per cent.), "A" quality, 1s. 6d. per unit; "B" quality, 1s. 3d.

Ammonia Products.—After an exceptional depression in sulphate, a little more life is beginning to be seen in it. One or two important contracts have been made during the week; and to-day's price may be taken as £11 15s. for the country and £11 17s. 6d. for London. For forward delivery, from 5s. to 10s. more is being asked.

The Extension of the Derby Corporation Water-Works.—The Water Committee of the Derby Corporation have resolved to recommend that body to purchase a piece of land adjoining the Little Eaton pumping-station for £3000, for the purpose of enlarging the works.

Progress of New Works of Water Supply at Leeds.—In moving the adoption of the minutes of the Water Committee at the meeting of the Leeds County Council last Wednesday, Mr. A. Cooke informed the members that the total length of the Blackmoor Tunnel already driven was 1459 yards; leaving 741 yards yet to be driven. The work was progressing very satisfactorily; and there still remained twelve months for the completion of it. With respect to the removal of the shallow puddle wall at the Eccup reservoir, the excavation now reached to a depth of 50 feet and there were 25 feet to be excavated. After this had been done, they would have to penetrate through the rock to the extent of 75 feet in order to reach the water-tight stratum, or the level of the other part of the puddle wall. The Meanwood Valley and Hunslet pipe-line, or the 30-inch main from Weetwood, has been carried 4868 yards; and it was expected that the remaining 300 yards would be completed in two or three weeks.

The Glasgow Corporation and the Partick, Hillhead, and Maryhill Gas Company's Bill.—At the meeting of the Glasgow Town Council last Thursday, the draft of a petition against the Gas and Electricity Supply Bill of the Partick, Hillhead, and Maryhill Gas Company, which had been considered and passed by the Special Sub-Committee on Electric Lighting, was submitted to the Council and approved. As the proposals contained in the Bill seriously interfere with the vested interests of the Corporation as Gas Trustees, as well as with the existing rights and privileges of a large section of the gas consumers within the Corporation area of supply, the Sub-Committee thought that a brief summary should be given of the past history of the Company, and an epitome of the powers they ask Parliament to confer upon them by the Bill. The petition recited the conditions under which the Corporation acquired the gas supply of the district in 1869, and the starting of the Company, but without statutory powers to open the streets, two years later. An attempt to obtain these powers in 1873 was successfully opposed by the Corporation, and supported by Parliament, who rejected the Company's Bill on the ground that a gas supply undertaking—that of the Corporation—was already in existence in their district. When, in 1886, the Corporation promoted a Bill for the annexation of Partick and Kelvinside, the Company, by means of a petition against it, renewed their attempt to obtain statutory recognition. Thereupon a clause was inserted authorizing the Police Commissioners to grant the required authority to lay down pipes, and the measure successfully passed the Lower House. In the House of Lords, however, the Corporation failed to prove the preamble of the Bill, and consequently the clause never came into operation. In the Boundaries Bill of the present session a similar provision has been inserted. By their present Bill the Company not only repeat their attempts to obtain statutory powers to compete with the Corporation, but ask Parliament to confer upon them an exclusive right of supply over the district, without making any compensation to the Corporation beyond paying them the ascertained value of their existing mains. The following may be stated as the result of the proposals contained in the Bill:—(1) That the Corporation are to be excluded from a valuable area, in respect of which they have made heavy payments and undertaken onerous obligations. (2) That the inhabitants of the western and north-western districts of Glasgow are to be excluded from the benefit of a supply of gas by the Corporation, with all the advantage which this supply secures, both as regards quality and price. (3) That an unrestricted monopoly is to be re-established in favour of one proprietary Company, and the position of the inhabitants of certain districts of the city made absolutely worse than it would have been had the Corporation never acquired the right to supply gas to the city and its suburbs.

An Electric Lighting Engineer for Dublin.—The Dublin City Council have decided to appoint an electric lighting engineer for the city at a salary of £200 a year, with increments.

Telegraphic Wire Boxes and Gas Leakages.—The postal authorities at Barnsley have been annoyed for some little time by escapes of gas in the "flush" boxes which contain the underground telegraphic wires; and employees of the Barnsley Gas Company during the past week have been endeavouring to discover the causes of the escapes, and have tested the boxes frequently. On Thursday morning one of the men tried a box by striking a match. Immediately a loud explosion occurred. The man had a remarkable escape, being injured in the face by a piece of stone. The shock was felt a considerable distance away; whilst it blew the covering of the box (weighing about 1 cwt.) into the air, and it fell at a distance of fully fifty yards.

Proposed Extension of the Rochdale Gas-Works.—At the monthly meeting of the Rochdale Town Council last Thursday, it was decided in accordance with a recommendation of the Gas Committee, that a retort-house should be erected on the site of the old offices; and the Gas Engineer (Mr. T. Banbury Ball) was instructed to prepare plans for the work. The extensions have been rendered necessary by the increasing demand for gas. The year which will end on the 25th of March next promises to be noticeable in the history of the works from the abnormally large consumption of gas. Already the increase in the quantity made amounts to upwards of 16 million feet; and there is every likelihood of it approaching 20 millions before the year closes.

The Plymouth Water Reservoir Question.—A meeting of owners and ratepayers of Plymouth was held yesterday week, to take into consideration and determine upon the expediency or not of consenting to the promotion by the Council in the next session of Parliament of a Bill, authorizing the construction of a storeage reservoir at Harter, and to empower the borrowing of money for the purpose. The Mayor (Alderman Waring) presided; and moved a resolution in favour of the promotion of the Bill; and this was seconded by Mr. J. E. Moon, Chairman of the Water Committee, who addressed the meeting at some length. On the motion being put, about twenty hands were held up in favour; but an enormous preponderance of those present declared against the resolution, which the Mayor stated was lost. Mr. Moon demanded a poll of the town.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

For Stock Market Intelligence, see ante, p. 236.

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	16 Oct.	10½	Alliance & Dublin 10 p. c.	10	17½—18¾	+½	5 13 6
100,000	10	„	7½	Do. 7 p. c.	10	12½—13¾	..	5 11 1
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	100	108—110	..	4 10 11
100,000	20	28 Nov.	8	Bahia, Limited	20	19½—20½	..	7 16 1
200,000	5	14 Nov.	7½	Bombay, Limited	5	6¼—6¾	..	5 11 1
40,000	5	„	7½	Do. New	4	4¾—5¼	..	5 17 10
380,000	Stck.	14 Aug.	12½	Brentford Consolidated	100	218—223	..	5 9 10
125,000	„	„	9½	Do. New	100	160—164	..	5 12 10
220,000	20	12 Sept.	11	Brighton & Hove, Original	20	41—43	..	5 2 4
320,000	20	27 Sept.	11½	British	20	43—45	..	5 0 0
50,000	10	12 Sept.	11	Bromley, Ordinary 10 p. c.	10	19—21	..	5 4 9
39,000	10	„	8	Do. 7 p. c.	10	13—15	..	5 6 8
328,750	10	14 Nov.	10	Buenos Ayres (New) Limited	10	13—14	..	7 2 10
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	107—110	..	5 9 1
150,000	20	14 Aug.	8	Cagliari, Limited	20	25—27	..	5 18 4
550,000	Stck.	16 Oct.	13¾	Commercial, Old Stock	100	245—250	+1	5 10 0
130,000	„	„	10¾	Do. New do.	100	195—200	..	5 7 6
130,000	„	30 Dec.	4½	Do. 4½ p. c. Deb. do.	100	118—123	..	3 13 2
557,320	20	12 Dec.	13	Continental Union, Limited	20	46¼—47½	—½	5 9 6
242,680	20	„	13	Do. New '69 & '72	14	32—34	..	5 6 7
200,000	20	„	10	Do. 7 p. c. Pref.	20	37—39	..	5 2 6
75,000	Stck.	27 Sept.	10	Crystal Palace District	100	200—205	..	4 17 7
234,060	10	30 Jan.	13	European, Limited	10	23—25*	..	5 4 0
120,000	10	„	13	Do. New	5	7¼—18¼*	..	5 5 3
354,060	10	„	13	Do. do.	5	11¾—12¾*	..	5 4 0
5,470,620	Stck.	14 Aug.	13¾	Gaslight & Coke, A, Ordinary	100	246—251	+1	5 9 6
100,000	„	„	4	Do. B, 4 p. c. max.	100	100—105	..	3 16 3
665,000	„	„	10	Do. C, D, & E, 10 p.c. Pf.	100	254—259	..	3 17 3
30,000	„	„	5	Do. F, 5 p. c. Prt.	100	123—128	..	3 18 1
60,000	„	„	7½	Do. G, 7½ p. c. do.	100	182—187	..	4 0 4
1,300,000	„	„	7	Do. H, 7 p. c. max.	100	160—165	..	4 4 10
463,000	„	„	10	Do. J, 10 p. c. Prf.	100	252—257	..	3 17 9
1,061,150	„	12 Dec.	4	Do. 4 p. c. Deb. Stk.	100	114—117	..	3 8 5
294,850	„	„	4½	Do. 4½ p. c. do.	100	122—127	..	3 10 10
650,000	„	„	6	Do. 6 p. c. do.	100	160—170	..	3 10 7
3,800,000	Stck.	14 Nov.	12	Imperial Continental	100	213—218	..	5 10 1
75,000	5	12 Dec.	6	Malta & Mediterranean, Ltd.	5	5—5¼	..	5 9 1
560,000	100	1 Oct.	5	Met. of Melbourne, 5 p. c. Deb.	100	113—115	..	4 6 11
541,920	20	28 Nov.	6	Monte Video, Limited	20	18¾—19¾	..	6 3 1
150,000	5	28 Nov.	10	Oriental, Limited	5	8¾—9	..	5 11 1
60,000	5	27 Sept.	7	Ottoman, Limited	5	5¾—6¼	..	5 12 9
166,870	10	26 July	4	Pará Limited	10	3¾—4¼	..	8 17 9
420,000	100	2 Nov.	6	People's Gas of Chicago— 1st Mtg. Bds.	100	100—105	..	5 14 3
500,000	100	2 Dec.	6	2nd Do.	100	95—100	..	6 0 0
100,000	10	16 Oct.	10	San Paulo, Limited	10	14¾—15¼	..	6 9 2
500,000	Stck.	29 Aug.	16½	South Metropolitan, A Stock	100	285—295	—10	5 9 6
1,350,000	„	„	12½	Do. B do.	100	220—230	—5	5 5 5
141,500	„	„	13¾	Do. C do.	100	235—245	—5	5 8 2
600,000	„	30 Dec.	5	Do. 5 p. c. Deb. Stk.	100	137—142	..	3 10 5
60,000	5	12 Sept.	11½	Tottenham & Edm'nton, Orig.	5	11—13	..	4 8 5
				WATER COMPANIES.				
728,446	Stck.	30 Dec.	9¾	Chelsea, Ordinary	100	260—265	..	3 11 8
1,720,560	Stck.	16 Oct.	7½	East London, Ordinary	100	211—215	..	3 9 9
544,440	„	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	143—148	..	3 0 10
700,000	50	12 Dec.	9	Grand Junction	50	123—128	..	3 10 4
708,000	Stck.	29 Aug.	10½	Kent	100	270—281	..	3 14 9
1,043,800	100	30 Dec.	9½	Lambeth, 10 p. c. max.	100	252—256	..	3 14 2
406,200	100	„	7½	Do. 7½ p. c. max.	100	197—202	..	3 14 3
200,000	Stck.	27 Sept.	4	Do. 4 p. c. Deb. Stk.	100	124—128	..	3 2 6
500,000	100	14 Aug.	12½	New River, New Shares	100	365—370	..	3 5 6
1,000,000	Stck.	30 Jan.	4	Do. 4 p. c. Deb. Stk	100	127—130*	..	3 1 6
902,300	Stck.	12 Dec.	6	S'thwk & V'xhall, 10 p. c. max.	100	165—170	..	3 10 7
126,500	100	„	6	Do. 7½ p. c. do.	100	163—168	..	3 11 5
1,155,066	Stck.	12 Dec.	10	West Middlesex	100	260—265	..	3 13 6
						*Ex div.		

The Falmouth Gas Company's Bill.—At meetings of the Falmouth Town Council and Local Board last Thursday, resolutions were passed in favour of steps being taken to oppose the Gas Company's Bill, and charging the costs incurred on the borough rate and borough fund.

The Northampton Town Council and Electric Lighting.—At the meeting of the Northampton Town Council yesterday week, it was agreed that consent should be given to a Provisional Order applied for by the Northampton Electric Light and Power Company, Limited, and that any resolutions to the contrary should be rescinded.

The Burnley Gas and Water Works Extension.—A Local Government Board inquiry was opened at Burnley last Tuesday, with reference to an application by the Corporation to borrow £4820 for extending the gas-works, and for completing the water-works at Cant Clough, which will cost £130,000, as against an estimate of £60,000. At a meeting of the Gas Committee, held on Thursday, Mr. Button, Surveyor, and Mr. J. P. Leather, Gas Manager, presented plans of proposed extensions at the gas-works, the total cost, including the erection of a new retort-house, being £30,000. It was decided to lay the plans before Mr. Corbet Woodall, C.E., who made an inspection of the works some time ago.

Sales of Shares.—At a sale by auction held at Salisbury last Wednesday, by Messrs. Waters and Rawlence, some new ordinary 8 per cent. shares in the *Salisbury Gas Company* of the nominal value of £12 10s. sold for £21 12s. 6d. per share; and some new ordinary 7 per cent. shares in the undertaking realized £19 2s. 6d. and £19 5s. per share. Some fully-paid £5 shares in the *Tisbury Gas Company* were sold for £5 10s. each.——At an auction sale at Bacup last Wednesday, some old £10 shares in the *Rossendale Union Gas Company* fetched £21 2s. 6d. each; and new £10 shares, £21 1s. each; Amendment Act Shares brought £15 and £14 18s. each; new Amendment Act Shares of £10 (£4 10s. per share paid up, and £5 10s. paid in advance of calls) realized £11 17s. each; and £10 shares of the 1876 Amendment Act (£2 per share paid up, and £4 per share paid in advance of calls) sold for £7 13s.

The Oil Lighting at Erith.—Our local correspondent writes that the oil-lighting experiment at Erith cannot be said to have turned out satisfactorily either to the lighting contractors or the Local Board. He says the latest complaint is that the lamps are extinguished an hour too early in the morning; and it has been ordered that Messrs. Defries' attention shall be called to the matter. At Belvedere, the large lamp has not been lighted for some days, and the oil has dripped into the drinking fountain beneath and interfered with its use. Complaints have been made of the oil dropping from the lamps—not, it seems, through the carelessness of the men in charge so much as from the heat of the lanterns, which makes the oil boil over, and causes it to drip on to the path beneath. As to the illuminating power, he states that whatever it may be when the lamps are first lit, it is considerably deteriorated by the lanterns speedily becoming blackened by the smoke. Matters have now come to such a pass that the Local Board have decided that if the terms of the contract are not acted up to, they will make an arrangement with the West Kent Gas Company, and refuse to pay for the oil lighting.

The Northern Coal Trade.—There has been a falling off in the demand for coal during the past few days, and the price is lower; but the collieries are still fully employed, and are likely to be so for some time to come. Steam coal is now down to about 13s. per ton, free on board in the Tyne, for best Northumbrian. Other kinds of steam coal are at proportionate prices. Gas coal is still in full demand, and the quantity now being exported will make up for the decrease showing itself in the local consumption. The fine clear weather further limits the local demand for gas as compared with that usual at this time of the year. Durham gas coal varies much in price—from 13s. to 14s. being, however, the current quotation. A contract for the supply of about 36,000 tons of gas coal to Stockholm during the season, defines the price as about 11s. 9d., free on board in the Tyne, for such contracts; but it is probable that others will soon be concluded for the Baltic. Household coal is very dull in the demand just now; the London consumption being limited. Manufacturing coal is firm, and the demand large. There are some signs of recovery in the price of coal generally, in anticipation of earlier Baltic shipments this year.

GWYNNE & CO., ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C.

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS & ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 2698.

Exhausters of nearly all sizes in Stock.

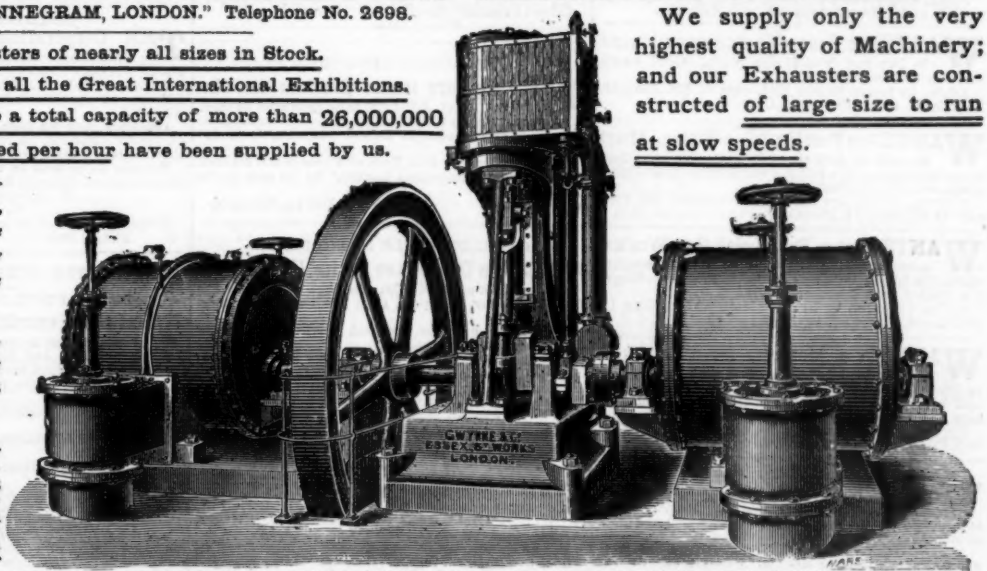
Prize Medals at all the Great International Exhibitions.

Exhausters equal to a total capacity of more than 26,000,000 cubic feet passed per hour have been supplied by us.

Our new Patent Non-Fluctuating Exhausters, to work without the slightest oscillation or variation in pressure, are strongly recommended.

MAKERS OF EVERY DESCRIPTION OF HYDRAULIC AND GAS MACHINERY.

Gwynne & Co.'s New Catalogue and List of Testimonials can now be obtained on application.



Exhausters and Vertical Engine as supplied for both the Fulham and Bromley-by-Bow Stations of The Gaslight and Coke Company

We supply only the very highest quality of Machinery; and our Exhausters are constructed of large size to run at slow speeds.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAYS.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

ANDREW STEPHENSON, Agent for the GAS PURIFICATION AND CHEMICAL COMPANY, Limited, Palmerston Buildings, Old Broad Street, LONDON, E.C.

CANNEL COAL, ETC.

JOHN ROMANS & SON, EDINBURGH.
Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, No. 54, BERNARD STREET, LEITH, SCOTLAND.

TIMMIS & CO., of STOURBRIDGE,
Make only the best quality of FIRE-CLAY RETORTS, BRICKS, TILES, & LUMPS. Also SPECIAL SILICA BRICKS, to stand great heats. All descriptions kept in Stock.
For Prices apply to JAMES LAWRIE AND CO, 1, Whittington Avenue, Leadenhall Street, E.C., Sole Agents for London and District.
Telegraphic Address: "EIRWAL, LONDON."

W. C. HOLMES & Co., Huddersfield, AND 80, CANNON STREET, LONDON,
Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.
*** See Advertisement p. 218 of last week's issue.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1880, for Wet and Dry Gas-Meters, Station Meters, and Governors, Pressure-Gauges, Street Lamps, and Pillars, &c.
Telegraphic Address: "Braddock, Oldham."

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. Spent Oxide and Sulphate of Ammonia purchased.
190 and 121, NEWGATE STREET, LONDON, E.C.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID for making SULPHATE OF AMMONIA of high quality and colour. *Delivery in Railway Tank-Wagons or Carboys.*
Highest References and all particulars supplied on application.

HUTCHINSON BROTHERS, Barnsley,
Gas Engineers and Contractors, Makers of Wet and Dry Gas-Meters and General Gas Apparatus, Sulphate of Ammonia Plant, Lead Saturators, Tanks, &c., Tools and Sundries.

TAR and Liquor wanted.
BROTHERTON AND Co., Commercial Buildings, LEEDS.

COZE'S Automatic Apparatus for CHARGING AND DISCHARGING GAS-RETORTS. For Illustrated Advertisement of this System, see p. 218.
Inquiries should be addressed to SIDNEY HERSEY, 70, OXFORD STREET W.

TO PROVINCIAL GAS AND WATER MANAGERS.

A BONUS OF £20 will be given to any Gas or Water Manager who can introduce a suitable Business (Grocery or Provisions preferred) to the Advertiser, who has Money to invest in a really first-class Concern.
This Advertisement is inserted in the JOURNAL as Gas and Water Managers or their Collectors are likely to hear of such Businesses being for disposal without their being publicly offered.
Address (in confidence) No. 1786, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

AGENTS wanted for Gardner's New PATENT REGENERATIVE GLOBE COVER. 20 to 100 per cent. increase of Light with present Fittings, Gas, and Globes — the results arrived at by a series of tests by Gas Experts. Retail Prices from 1s. to 1s. 9d. each, according to size. One trial gives convincing proof.
Send business card, with references, to the Patentees, A. GARDNER AND SON, 36, Jamaica Street, GLASGOW.

SITUATION required by a Junior Clerk in a Gas-Works' Office. Can read Meters, and can be well recommended. Excellent testimonials. Age 19.
Address J. H., 1, Burton End, Haverhill, SUFFOLK.

TAR AND AMMONIA WORKS.

WANTED, a Situation as Works MANAGER or FOREMAN. Ten years' experience. Used to large Works. Age 35.
Address No. 1787, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Meter Repairer and Gas- FITTER.
Apply, with testimonials, stating age and wages expected, to the MANAGER, Gas-Works, HEYWOOD.

WANTED, a Brass Worker, experienced in Dry and Wet Meter Work. Good wages and constant employment.
Apply, by letter, to No. 1784, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Practical Gas-Fitter. Must be well up in Main and Service Laying. Constant employment to a suitable man. Sobriety and good character indispensable.
Address, stating age and wages expected, No. 1788, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, at a Provincial Gas-Works, a competent ENGINE DRIVER, thoroughly up to his Work. Age not to exceed 35 years. Wages 25s. weekly, with Bonus on results.
Apply, by letter, to No. 1782, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Manager for a Tar and Ammonia Works. A first-class man would be liberally dealt with. Must show good testimonials, and hold good references. None but fully efficient men need apply. Age from 30 to 40.
Apply, by letter, to No. 1786, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO MAIN AND SERVICE LAYERS.

WANTED, a thoroughly experienced MAIN and SERVICE LAYER. Must be steady and reliable, and be capable of taking charge of a gang of men when necessary. Wages 6s. per day.
Applications in candidate's own handwriting, with references to present or late employer, to be sent in not later than Friday, the 14th of February current, addressed to No. 1785, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CANTERBURY GAS AND WATER COMPANY.

WANTED, a second Working Engineer and STOKER at the Water-Works. He must be competent to take charge of the Pumping and other Machinery if required, and make himself generally useful.
Applications, with testimonials, stating age and wages required, to be addressed to me,
JAMES BURCH, Secretary.
Castle Street, Canterbury,
Feb. 3, 1890.

WANTED, Offers for from 18 to 30 RETORT MOUTHPIECES, 15 by 18 or 20 in., with 6-inch Faucet. New or second hand; in good condition.
Full particulars to JAS. WHYTE, Gas-Works, SEAHAM HARBOUR.

WANTED, a Tower Scrubber, about 2 ft. 6 in. diameter, and from 15 to 20 feet high. Also a Second-hand LIVESEY WASHER, with 6-inch Connections. They must be in good condition, and of a moderate price.
Particulars and prices to be addressed to F. J. WARD, Gas-Works, AMERSHAM.

FOR SALE—One Single Gasholder, 80 feet by 20 feet (owing to extensions at Blackpool). To be erected complete; in first-rate condition.
Apply to CLAYTON, SON, AND Co., LIMITED, Hunslet, LEEDS.

LEEDS CORPORATION GAS DEPARTMENT.

FOR SALE—A small Gasholder, capacity about 80,000 feet; also 2½-horse power TABLE ENGINE and BOILER, and 9 inch EXHAUSTER by George Jones, in good condition.
Further particulars on application to Mr. Lupton, Secretary; and offers for purchase to be addressed to the CHAIRMAN, Gas Department, Municipal Offices, LEEDS.

FOR SALE—One 8-horse power Engine and COAL BREAKER, with top and bottom Elevator, Gear, and Patent Wrought-Iron Chain, with Malleable Iron Buckets complete.
The above Machinery is almost new, having only been in use about Three months.
For further particulars, apply to the COAL DISTILLATION COMPANY—COOPER'S PATENTS—LIMITED, 322 and 323, Winchester House, Old Broad Street, LONDON, E.C.

TO BRICK MAKERS, CEMENT MANUFACTURERS, AND OTHERS.

COKE "BREEZE" FOR SALE.

TWO thousand tons of clean Breeze, delivered into Truck, at One Shilling per ton on Works, or Two Shillings f.o.b. South Docks, Swansea.
Apply, by letter, to No. 1779, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BRENTFORD GAS COMPANY.

SALE BY TENDER OF £25,000 NEW STOCK, 1881.

IN Pursuance of the Brentford Gas Order, 1881, NOTICE IS HEREBY GIVEN that it is the intention of the Directors of this Company to SELL by TENDER £25,000 of NEW STOCK, 1881, of the Company, to be paid up in full on or before the 31st day of March next, such Stock being a portion of additional Capital authorized to be raised by Resolutions passed at an Extraordinary Meeting of Proprietors, held on the 25th day of November, 1881, under the powers of the above-mentioned Order.
Particulars and conditions of tender may be obtained on application at this Office, and sealed tenders must be sent in not later than Twelve o'clock noon on Monday, the 10th day of March next.
By order,
WM. CROXFORD, Secretary.
Office: Brentford Gas Company, Brentford,
Feb. 8, 1890.

CLEVEDON GAS-WORKS.

THE Directors invite Tenders for the AMMONIACAL LIQUOR to be produced at their Works from March 1, 1890. Schedule of prices required into tank at Clevedon or Bristol Stations, from 10° to 16°.
Sealed tenders for One, Two, or Three years, marked "Tender for Ammoniacal Liquor," to be sent to the Chairman.
S. DAWES, Manager.

OSWALDTWISTLE LOCAL BOARD.

THE Gas Committee invite Tenders for the TAR and LIQUOR produced at the Church Gas-Works, for One year, from the 1st of February, 1890.
Particulars may be obtained from the Manager (T. Loxley) at the works.
Endorsed tenders to be sent to me not later than Noon, of Thursday, the 13th of February.
WM. SANDEMAN, Clerk.
Local Board Offices, Oswaldtwistle,
Jan. 31, 1890.

RAMSGATE CORPORATION GAS AND WATER DEPARTMENT.

THE Committee invite Tenders for the supply of about 490 feet of STOURBRIDGE or WORTLEY CLAY RETORTS, 48,000 FIRE-BRICKS, various sizes and shapes, and 20 tons of CLAY.
Tenders to be sent in not later than noon on Monday, Feb. 17, addressed to the Chairman of the Gas and Water Committee, Hardres Street, Ramsgate, endorsed "Fire Goods."
Full particulars on application to
WILLIAM A. VALON, Engineer.

TO CONTRACTORS.

THE Market Harborough Gas Company are desirous of receiving TENDERS for converting a 60-feet SINGLE-LIFT GASHOLDER into a TWO-LIFT.
Specification and Plan may be seen on application at the Works, on payment of One Guinea, which will be returned on receipt of a *bonâ fide* tender.
Sealed tenders, marked "Gasholder," to be sent to Mr. T. J. Smith, St. Mary's Road, Market Harborough, by the 25th of February next.
By order,
CHAS. BURGOINE, Secretary.
Jan. 29, 1890.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the purchase of about 350 tons of SPENT OXIDE.
Further particulars and form of tender may be obtained from the Gas Engineer, Gas Offices, Bloom Street.
Sealed tenders, endorsed "Tender for Spent Oxide," and addressed to the Chairman of the Gas Committee, must be sent to me not later than Five o'clock p.m., on Thursday, the 20th inst.
By order,
SAML. BROWN, Town Clerk.
Town Hall, Salford, Feb. 7, 1890.

PADIHAM AND HAPTON LOCAL BOARD.

THE Gas Committee of the above Board invite TENDERS for the surplus TAR and AMMONIACAL LIQUOR to be produced at the Padiham Gas-Works for One year, commencing March 25, 1890.
Particulars may be obtained from the Manager.
Endorsed tenders must be sent to me on or before Saturday, March 1.
J. R. SMITH, Clerk to the Board.
Local Board Offices,
Padiham, Feb. 7, 1890.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Gomersal Gas Company invite TENDERS for the TAR and AMMONIACAL LIQUOR now in stock at their Works; also for the SURPLUS produced up to July 1, 1891.
Further particulars may be obtained from the undersigned, to whom sealed tenders (endorsed) must be sent on or before the 1st prox.
By order,
JOSEPH W. PITTS,
Manager and Secretary.
Gas-Works, Gomersal,
Feb. 5, 1890.

SWINDON NEW GAS COMPANY, LIMITED.

GASHOLDER TANK AND GASHOLDER.

THE Directors of the above Company are prepared to receive TENDERS for the construction of a BRICK TANK for a Gasholder, 100 ft. by 20 ft.
Also for the supply and erection of a GASHOLDER. Dimensions as above.
The drawings and specifications can be seen at the Offices of the Company.
Sealed tenders, endorsed "Gasholder Tank," or "Gasholder," to be sent to the undersigned, not later than March 8, 1890.
The Directors do not bind themselves to accept the lowest or any tender.
By order,
JOHN J. JERVIS,
Secretary and Manager.
Feb. 8, 1890.

BOROUGH OF ROTHERHAM.

GAS-WORKS.

TO IRONFOUNDERS.

THE Corporation of Rotherham are prepared to receive TENDERS for 8 WROUGHT-IRON HYDRAULIC MAINS, 21 OVAL MOUTHPIECES, 21 ARCH-PIPES and COVERS, 21 DIP-PIPES, 22 ASCENSION-PIPES, and 12 BUCK-STAVES.
Drawings may be seen, and specification and form of tender obtained, on application to the Manager, at the Corporation Gas-Works in Rotherham.
Tenders to be sent in to me on or before the 17th inst., endorsed "Tender for Retort-Fittings,"
By order,
H. H. HICKMOTT, Town Clerk.
Council Hall, Rotherham,
Feb. 7, 1890.

MANCHESTER CORPORATION GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the purchase and removal of the GAS TAR to be produced at their several stations, during a period of One, Two, or Three years, commencing as follows, viz.:—
Bradford Road Station, from Noon on the 31st of March, 1890.
Rochdale Road Station, from Noon on the 24th of June, 1890.
Gaythorn Station, from Noon on the 1st of August, 1890.
The Committee do not bind themselves to accept the highest or any tender, and reserve the right to divide the tenders as they may consider advisable.
Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Tar," must be delivered at the Offices of the Gas Department, Town Hall, on or before Thursday, the 13th of February next.
Forms of tender and other particulars may be obtained on application in writing to Mr. Charles Nickson, Superintendent of the Department.
By order of the Gas Committee,
WM. HENRY TALBOT, Town Clerk.
Town Hall, Manchester, Jan. 17, 1890.

LOCAL BOARD OF TETTENHALL.

THE Local Board of Tettenhall are prepared to receive TENDERS for the construction of MAIN and SUBSIDIARY SEWERS and WORKS for SEWAGE DISPOSAL, in accordance with the drawings and specifications of their Engineers, Messrs. H. J. and E. D. Marten, of 4, Storey's Gate, Great George Street, Westminster, S.W., and The Birches, Codsall, Wolverhampton.
Persons desirous of tendering may obtain a copy of the specifications and bill of quantities, and may inspect the drawings on application to Mr. Arthur M. Manby, the Clerk to the Board, at his Offices, No. 100, Darlington Street, Wolverhampton, on and after Thursday, Feb. 6, 1890, and on payment to him of the sum of half-a-guinea, which will not be returned.
Sealed tenders, endorsed "Tender for Sewerage Works," and addressed to Mr. Arthur M. Manby, Clerk to the Local Board of Tettenhall, No. 100, Darlington Street, Wolverhampton, to be delivered not later than Three o'clock, on the Afternoon of Wednesday, the 12th of March, 1890.
The Board do not bind themselves to accept the lowest or any tender.
By order,
ARTHUR M. MANBY,
Clerk to the Board.
The Local Board of Tettenhall,
Tettenhall, Staffordshire.

THE GAS, WATER, AND GENERAL INVESTMENT TRUST, LIMITED.

NOTICE is hereby given that the TRANSFER BOOKS of the Preferred and Deferred Stocks of the above Trust WILL BE CLOSED from the 15th to the 28th of February, both days inclusive.

By order of the Board,
J. A. KELMAN, Secretary.

251, Winchester House, London, E.C.,
Feb. 5, 1890.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is hereby given, that the Half-YEARLY ORDINARY GENERAL MEETING of the Proprietors in the Company will be held at the Company's Offices, Willoughby Lane, Tottenham, on Saturday, the 22nd day of February inst., at Three o'clock in the Afternoon precisely, to receive the Report of the Directors, the Statement of Accounts for the Half Year ended Dec. 31, 1889, to declare Dividends, and to transact such other Business as the Act of Parliament directs.

The Transfer Books will be closed on Saturday, the 8th, until the 24th inst., both days inclusive.

NOTICE IS HEREBY ALSO GIVEN, that an EXTRAORDINARY MEETING of the Proprietors will be held immediately after the Ordinary Meeting, to consider, and if approved of, to pass RESOLUTIONS which will then be submitted with reference to the issue of FURTHER CAPITAL.

By order of the Board,
JAMES RANDALL, Secretary.

Offices of the Company, Willoughby Lane,
Tottenham, Feb. 7, 1890.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY MEETING of this Company will be held at the "Bell Hotel," Bromley, Kent, on Thursday, the 27th day of February inst., to receive the Report of the Directors, the Balance-Sheet confirmed by the Auditors, to declare a Dividend for the Half Year ending the 31st day of December last, and for General Purposes.

NOTICE IS HEREBY ALSO GIVEN that at such Meeting RESOLUTIONS will be proposed by the Directors to authorize the Company, under the provisions of the Bromley Gas Act, 1879, to raise FURTHER CAPITAL by the issue of such a number of New Ordinary Shares of £10 each with a standard rate of Dividend of £7 per cent. per annum, not exceeding in the whole 2000 of such Shares, and to offer such Shares for Sale by Auction or Tender at such times, upon such terms, subject to such conditions, and in such manner as the Directors may think fit.

Also to empower the Directors as and when authorized by the same Act, to BORROW ON MORTGAGE of the Company's Undertaking any FURTHER SUM OR SUMS, not exceeding in the whole £5000 in addition to the Sum of £25,000 already borrowed.

The chair will be taken at Six o'clock p.m. precisely.

The Transfer Books will be closed from the 12th day of February until after the Meeting.

By order of the Board,
GEORGE H. OSBORN,
Secretary and Manager.

Offices of the Company: At the Works,
Bromley, Kent, Feb. 12, 1890.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Inventions may be secured for Twelve months; or LETTERS PATENT, which are granted for Fourteen Years.

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Chemist and Superintending Gas Examiner to the London County Council.

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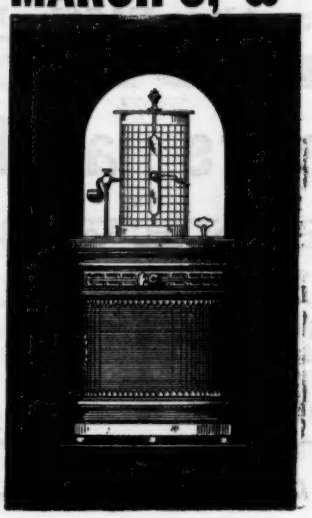

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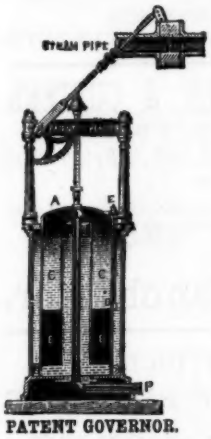

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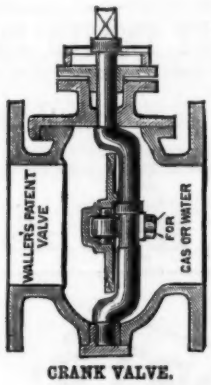

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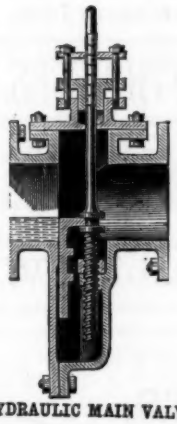

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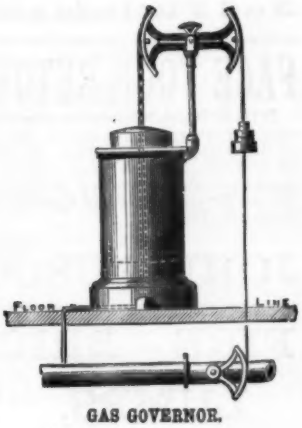

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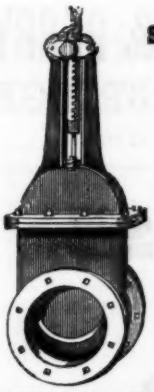

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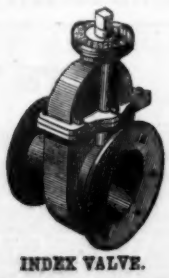

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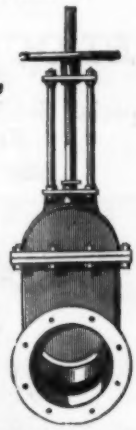

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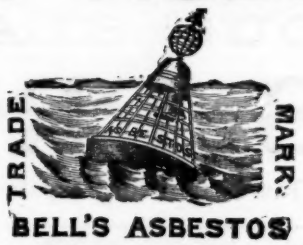

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IS MANUFACTURED IN ALL USEFUL COLOURS.
IS IMPERVIOUS TO HEAT, COLD, OR WATER.
IS WITHOUT SMELL.

No expensive Oil or Turpentine required.

WILL NEVER BLISTER.

HAS A COVERING CAPACITY **40** PER CENT. GREATER THAN LEAD PAINTS.

For Outside or Inside Work in any Climate.

Bell's Asbestos Aquol Paint is equally suitable for the finest decorative work as well as for general painting. It can be applied over or under any other paint, and, owing to its easy application, can be used with a large distemper brush; the SAVING THUS EFFECTED IN LABOUR BEING **50** PER CENT. OVER THAT OF LEAD PAINTS.

Bell's Asbestos Aquol Paint is susceptible of the most delicate treatment; and, owing to its perfect flatted surface, it brings up the varnish in a manner that no other paint can equal. ONE COAT OF VARNISH ON **Bell's Asbestos Aquol** IS EQUAL TO TWO COATS ON ORDINARY PAINT.

BELL'S ASBESTOS AQUOL PAINT is specially adapted for Private Houses, Exhibition Buildings, Ships, Churches, Asylums, School Boards, Railway Stations, and all work of Wood, Iron, Cement, Plaster, Stone, Brick, &c., &c.

Those who Study Economy and Protection from Fire should use only

BELL'S ASBESTOS AQUOL PAINT.

BELL'S ASBESTOS AQUOL PRIMING is made Ready for Use.
BELL'S ASBESTOS AQUOL PRIMING stops all suction of Wood, Cement, Plaster, &c.
BELL'S ASBESTOS AQUOL PRIMING should be applied to all New Work.

Suitable for Ceilings, Walls, and New Wood, and is very durable.

BELL'S ASBESTOS AQUOL KNOTTING, for Stopping Knots in New Work.

AN EXCELLENT CURE FOR DAMP WALLS.

Colour Cards and Price Lists on Application.

Supplied in Casks of 5 to 7 cwt., and Iron Drums of 28, 56, and 112 lbs., Sample Tins of 7 and 14 lbs.

Owing to its Covering Capacity, a SAVING IN FREIGHT of 40 per cent. is effected for a given surface.

BELL'S ASBESTOS COMPANY, LIMITED,

SOUTHWARK, LONDON, S.E.

DEPOTS—MANCHESTER: Cable Street, Blackfriars. LIVERPOOL: 2, Strand Street, James Street. CARDIFF: West Bute Street. BIRMINGHAM: 7, John Bright Street. HULL: Humber Dock Basin. GLASGOW: 35, Robertson Street. DUBLIN: 2, St. Andrew Street. BERLIN, BARCELONA, and ANTWERP.

BELL'S ASBESTOS DAGGER PACKING

PATENT No. 15,493.

ROUND.

SQUARE.

Every 10 feet has Label as above, and bears our Trade Mark.

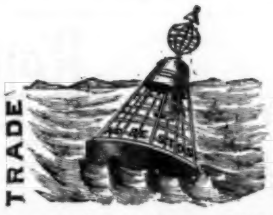
Under this registered title are included the inventions of Mr. Field; and experience has proved them to be the MOST EFFICIENT DURABLE, and ECONOMICAL PACKINGS ever made. They constitute such a combination of Asbestos and India-rubber as secures the maximum of elasticity and heat resistance; and they are, therefore, UNEQUALLED FOR EVERY KIND OF ENGINE. These Packings are being universally used by most of the leading Steamship Companies throughout the world for ordinary Compound, Triple, and Quadruple Expansion Engines of the latest types. The packings are composed of rolled Asbestos Cloth, but the India-rubber is placed in two forms to suit various cases.

IN ORDERING STATE WHETHER SQUARE OR ROUND IS REQUIRED.

BELL'S ASBESTOS CO., Ld.

DEPÔTS.

MANCHESTER: Cable St., Blackfriars.
LIVERPOOL: 2, Strand St., James St.
HULL: Humber Dock Basin.
DUBLIN, BERLIN.



DEPÔTS.

BIRMINGHAM: 7, John Bright Street.
GLASGOW: 35, Robertson Street.
CARDIFF: West Bute Street.
BARCELONA, and ANTWERP.

SOUTHWARK, BELL'S ASBESTOS. LONDON, S.E.

BELL'S ASBESTOS

YARN AND SOAPSTONE PACKING

Is the BEST LOCOMOTIVE PACKING made.

BELL'S

COMPOUND HYDRAULIC PACKING

Is specially suited for
Hydraulic Machinery, Accumulators, and Ammonia and all Pumps.

BELL'S ASBESTOS LUBRICANT

Is unequalled
For Steam-Engines & Cylinders, Gas-Engines, and every class of machinery.

BELL'S ASBESTOLINE

The reputation of this Lubricant is based on the experience of thousands of users, which places it far in advance of those who rely only on mere laboratory tests.

ASBESTOLINE IS THE CHEAPEST MOST EFFICIENT, CLEANEST MOST INODOROUS AND SAFEST LUBRICANT.

ASBESTOLINE HAS SAVED 90 PER CENT. OVER OIL.

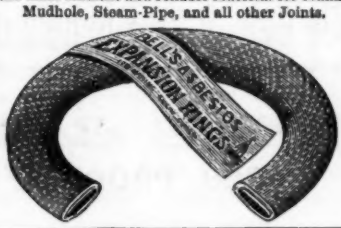
Has been used for all purposes, AND BEATEN ALL OTHER LUBRICANTS IN ACTUAL WORK.

BELL'S ASBESTOS

EXPANSION SHEETING

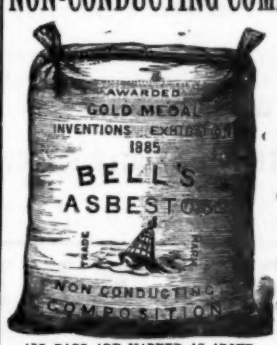
RINGS, AND TAPE.

Is the most efficient and reliable Material for Manhole, Mudhole, Steam-Pipe, and all other Joints.



BELL'S ASBESTOS

NON-CONDUCTING COMPOSITION.



Will reduce loss by radiation, and saves 40 per cent. of fuel.

Is suitable for boilers with flat or round bottoms. Is superior to any other, and saves its cost in a few months.

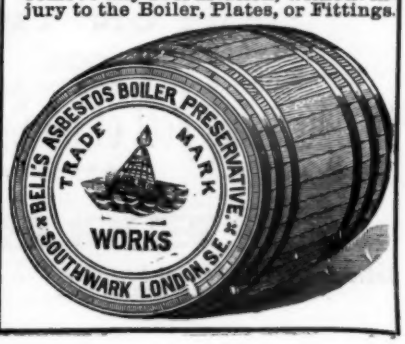
Is sent out dry in bags; therefore cheaper than others sent out wet.

ALL BAGS ARE MARKED AS ABOVE.

BELL'S ASBESTOS

BOILER PRESERVATIVE

Will effectually keep Boilers clean, and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



WILLIAM INGHAM & SONS,

WORTLEY FIRE-CLAY WORKS,
Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing Adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT

MACHINE-MADE GAS-RETORTS.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS OF FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

RETORTS CAREFULLY PACKED FOR SHIPMENT.

A STOCK OF DIFFERENT SHAPES ON HAND.

S. PONTIFEX & CO.,

GAS and WATER ENGINEERS,

Manufacturers of and Contractors for the Maintenance of

PUBLIC LAMPS & LANTERNS;

GLASS—Flint Opal, and Bent in Stock, and Cut to Sizes.

WELL LAMPS, STREET NAME TABLETS,

LAMP COLUMNS, HEAD IRONS, PUTTYLESS LAMPS,

LANTERN COCKS, REGULATORS,

Improved High-Power Lanterns for Lighting Street Refuges and Open Spaces.

BROWN'S PATENT

LAMPLIGHTERS' TORCHES.

PROPRIETORS AND MANUFACTURERS OF

BOX'S PATENT

PUTTYLESS STREET LAMP.

This Lamp may be supplied fitted with clear opal, or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing Lamps to this system can be supplied at moderate prices.

S. PONTIFEX & CO., 22, COLEMAN ST., LONDON.

Works: 18, STEPHEN STREET, TOTTENHAM COURT ROAD, W.

SIXTY PER CENT. ECONOMY IN GAS LIGHTING.

The Schülke Regenerative Lamp

FOR

DOMESTIC AND EXTERNAL LIGHTING.

The only Regenerative Lamp employing the Common Flat-Flame Burners.

Lamps giving 20-Candle power consume less than four feet of Gas per hour.

PURE WHITE & PERFECTLY STEADY LIGHT,

NOT AFFECTED BY DRAUGHTS.

Suitable for any existing fittings (Brackets or Suspending).

Can be fixed in a few minutes.

May be seen at the Offices of the

SCHÜLKE GAS-LAMP Co.

LIMITED,

Room 446—11, QUEEN VICTORIA STREET,

LONDON, E.C.,

Where Price Lists and full particulars may be obtained.

BRECKENRIDGE CANNEL,

OF KENTUCKY, U.S.A.

The undersigned, SOLE AGENTS for this celebrated Gas Cannel, now offer it for delivery at any port in

GREAT BRITAIN,

ON THE CONTINENT,

OR SOUTH AMERICA.

This Cannel ranks with the Australian Shale as an enricher of Coal Gas; One Gross Ton producing

15,000 Cubic Feet of 50-Candle Gas, & 26 Bushels of superior Marketable Coke.

FOR PRICES AND FURTHER PARTICULARS, APPLY TO

PERKINS & Co., SOLE AGENTS,

Cable Address: "Perkins New York."

228, PRODUCE EXCHANGE, NEW YORK.

JOSEPH CLIFF & SONS,

INCORPORATED IN
THE LEEDS FIRE-CLAY COMPANY, Ltd.,
WORTLEY, LEEDS.

LONDON Offices & Depôts:
Baltic Wharf, Waterloo Bridge.
WHARVES NOS. 2 & 4, INSIDE G.N. GOODS YARD, KING'S CROSS, N.
LIVERPOOL:
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LEEDS:
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MACHINE-MADE RETORTS

Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

ESTABLISHED MORE THAN A QUARTER OF A CENTURY

WORKS HUNSLET, LEEDS

LONDON OFFICE: 60, QUEEN VICTORIA STREET E.C.

CLAYTON SON & CO. LTD.

MAKE A SPECIALTY OF GASHOLDERS

AND MAKERS OF GAS PLANT OF EVERY DESCRIPTION.

REG^D TELEGRAPHIC ADDRESS: "GAS LEEDS"

JOHN BROWN & CO., LIMITED,

ATLAS STEEL AND IRON WORKS, SHEFFIELD,

ALDWARKE MAIN GAS COAL.

This Coal yields 12,600 feet of 16-candle gas per ton.
Weight of illuminating power in pounds of sperm, 820·80. Very free from impurities.

ORME'S GAS REGULATOR FOR STREET LAMPS

(Behl's Patent)

No. 200.
LAMP REGULATOR
Full Size.

Adopted by the leading GAS COMPANIES AND CORPORATIONS.

More than 150,000 now in use.

Strongly made, all Brass, as Illustration No. 200,

Price, 24/- per dozen.

ORME'S GAS REGULATOR

(BEHL'S PATENT),

No. 201, 202, 203, FOR DOMESTIC USE,

Saves from 20 to 50 per cent. of Gas.

Gives a bright and steady Light.

Price, 15/- per dozen.

SAMPLES UPON APPLICATION.

No. 201, ½ B Socket.
„ 202, ⅛ B Socket.

No. 203 Taper Screw.

STREET LANTERNS OF NEW DESIGNS.

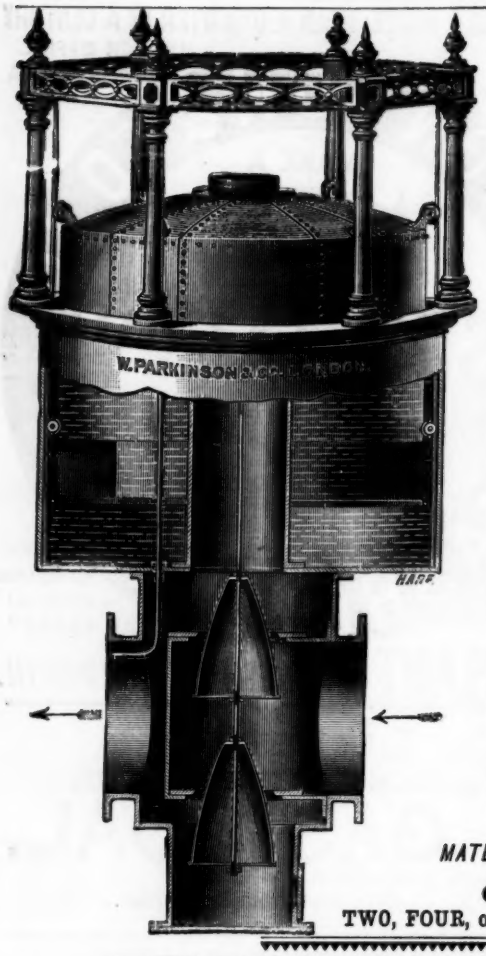
IMPROVED LAMP TORCHES.

ALL BRASS. EXTRA STRONG.

PRICE LIST AND FULL PARTICULARS UPON APPLICATION.

GEORGE ORME & CO., ATLAS METER WORKS, OLDHAM.

Telegraphic Address: "ORME OLDHAM."



PARKINSON'S
IMPROVED
EQUILIBRIUM GOVERNOR.

This Governor combines all the advantages of simplicity with perfect efficiency. It effectually overcomes the difficulty of varying pressures experienced by many Engineers owing to the change of light and heavy gasholders, and other causes.

Two parabolic cone valves are employed, one fitted above the other, as shown in the Engraving. By this means the flow of gas is divided, and passes equally through the valves, which are in perfect equilibrium, whatever position they occupy.

No "compensating arrangements" are therefore needed; no attention is required; and the management of the Governor is made as simple as it possibly can be.

In actual practice this Governor is found to be perfect in its action; and every detail in construction is carried out with the utmost care.

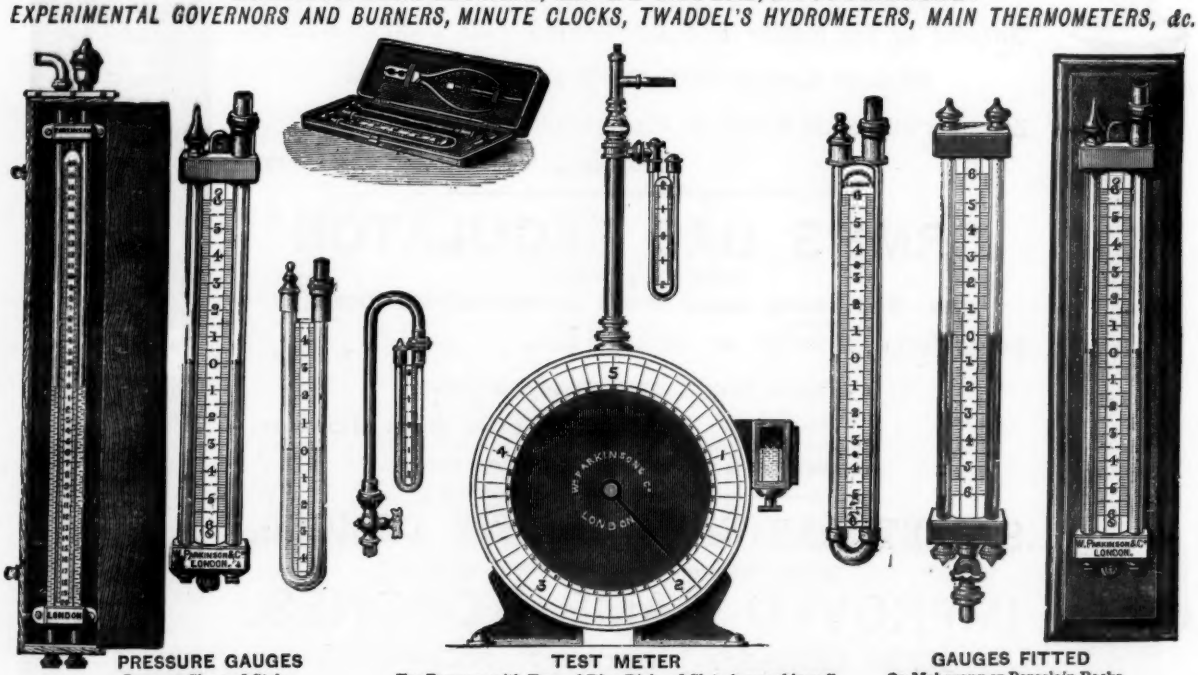
MATERIALS AND WORKMANSHIP OF THE VERY BEST QUALITY.

COUNTERBALANCE or AIR VESSEL, as desired.
TWO, FOUR, or SIX COLUMNS and GIRDERS.—WEIGHTS or WATER PRESSURE.

EXPERIMENTAL APPARATUS.

TEST METERS { For Official Inspectors and others, fitted with Parkinson's Patent Three-partition Drums. A 100-light Meter has recently been made for the City of London Corporation, and Stamped by the Board of Trade as a Standard Instrument.

SULPHUR-TEST METERS, KING'S GAUGES, PHOTOMETERS;
EXPERIMENTAL GOVERNORS AND BURNERS, MINUTE CLOCKS, TWADDEL'S HYDROMETERS, MAIN THERMOMETERS, &c.



PRESSURE GAUGES
In every Size and Style.

TEST METER
For Burners, with Enamel Ring Dial and Slate for marking off.
A most useful and necessary Instrument for every Gas Manager.

GAUGES FITTED
On Mahogany or Porcelain Backs or in Polished Wood Cases.

GOLD & SILVER MEDALS, Health Exhibition, London, 1884. SILVER MEDAL, Inventions Exhibition, 1885.

FULL PARTICULARS AND PRICE ON APPLICATION TO

W. PARKINSON & CO., GAS ENGINEERS, COTTAGE LANE WORKS, CITY ROAD, LONDON.

Telegraphic Address: "INDEX LONDON."

[See also Advt., p. 232.

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